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Summary of net plankton data and Secchi transparency data for the Nelson River and Rat-Burntwood lakes, 1987-89.

By Janusz, L. 1990

Manitoba
Natural Resources
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Manitoba Department of Natural Resources.
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ABSTRACT

According to Welch (1948), net plankton may be defined as "... plankton separated from water by means of a net ... and represents only a fraction of the total population".

During the 1987 to 1989 field seasons, net plankton samples were collected from Rat and Threepoint on the Rat-Burntwood river system and from Cross, Sipiwesk, Split and Stephens lakes on the Nelson River. These samples were taken at each gillnet location in conjunction with experimental fishing on each of the above lakes. Plankton samples were taken using a Wisconsin plankton net. Secchi disk transparency was also recorded at each plankton sampling location. The net plankton samples were later settled for a 24-hour period and volume measurements were taken. In this report histograms showing the mean annual settled volumes for each of the study lakes are presented.

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INTRODUCTION

The 1987 to 1989 data were compiled in conjunction with an ecological monitoring program under the auspices of Claim #18 of the Northern Flood Agreement. This study was initiated to assess the impact of the Churchill River diversion on the fish ecology of the northern lakes. It is necessary that all the monitored lakes have background information documented so that future comparisons can be made.

One aspect of ecological monitoring included the collection of phytoplankton samples from Rat, Threepoint, Cross, Sipiwesk, Split and Stephens lakes. Rat and Threepoint lakes, on the immediate Churchill river diversion route, are referred to as the diversion lakes. Cross and Sipiwesk lakes, situated at the upper reaches of the Nelson, are referred to as the Upper Nelson. Split and Stephens lakes, situated near the middle reach of the Nelson, are referred to as the Middle Nelson.

The main objectives of this report are:

1. to identify the locations where the net plankton samples were taken,
2. to summarize the settled volume measurements, and
3. to provide histograms of mean annual settled plankton volumes for each of the study lakes.

This report functions only to provide baseline information on the net plankton data of the aforementioned lakes and is not concerned with the interpretations of results. Tables summarizing the plankton samples are appended to this report in order to make the information readily available for future reference.

METHODS AND MATERIALS

Plankton samples were collected at the same time and location as were the experimental gillnet sets. A Wisconsin plankton net with an opening diameter of 25 cm and a mesh size of 73 µm was used. Samples were preserved in a 10% buffered formalin solution.

In the laboratory, the samples were allowed to settle and excess water was siphoned away using a pump and hose. A fine mesh was placed over the nozzle of the hose to ensure no loss of plankton. Where there was a dense layer of phytoplankton at the top of a sample, a pipette was used to remove it to another vial, enabling excess water to be siphoned off; otherwise the mesh over the nozzle of the hose would become clogged. Once the water was removed the phytoplankton was returned to the sample. The samples were then placed in a 50 ml settling tube and allowed to settle for 24 hours following the method of Bajkov (1930). A calibrated ruler was used to measure the total settled volume. Any material that remained in the water column or floated to the top of the tube was also measured. The samples were then dumped back into their containers and the tubes rinsed.

RESULTS

Net plankton locations for Rat, Threepoint, Cross, Sipiwesk, Split and Stephens are identified in Figs. 2-4, 6-8, 10-15, 17-19, 21-23 and 25-27. Because the plankton sampling sites correspond to the experimental gillnetting locations, the frequency and sequence of locations varied depending upon fish success, weather and water level conditions (Green, 1990). The East Basin of Cross Lake was not fished in 1990. Therefore no net plankton samples were taken. This was due to low water that prevented adequate navigation and net setting conditions (Green, 1990). Stephens Lake samples from locations 1-12 in 1990 are not available. More detailed figures indicating locations are found in the fish data reports by Green (1987-1990) and Hagenson (1988-1990).

The settled volume measurements for all the samples per lake are enumerated in tables in Appendices A1-A6. Histograms showing the mean annual settled volumes for each are in Figures 5, 9, 16, 20, 24 and 28.

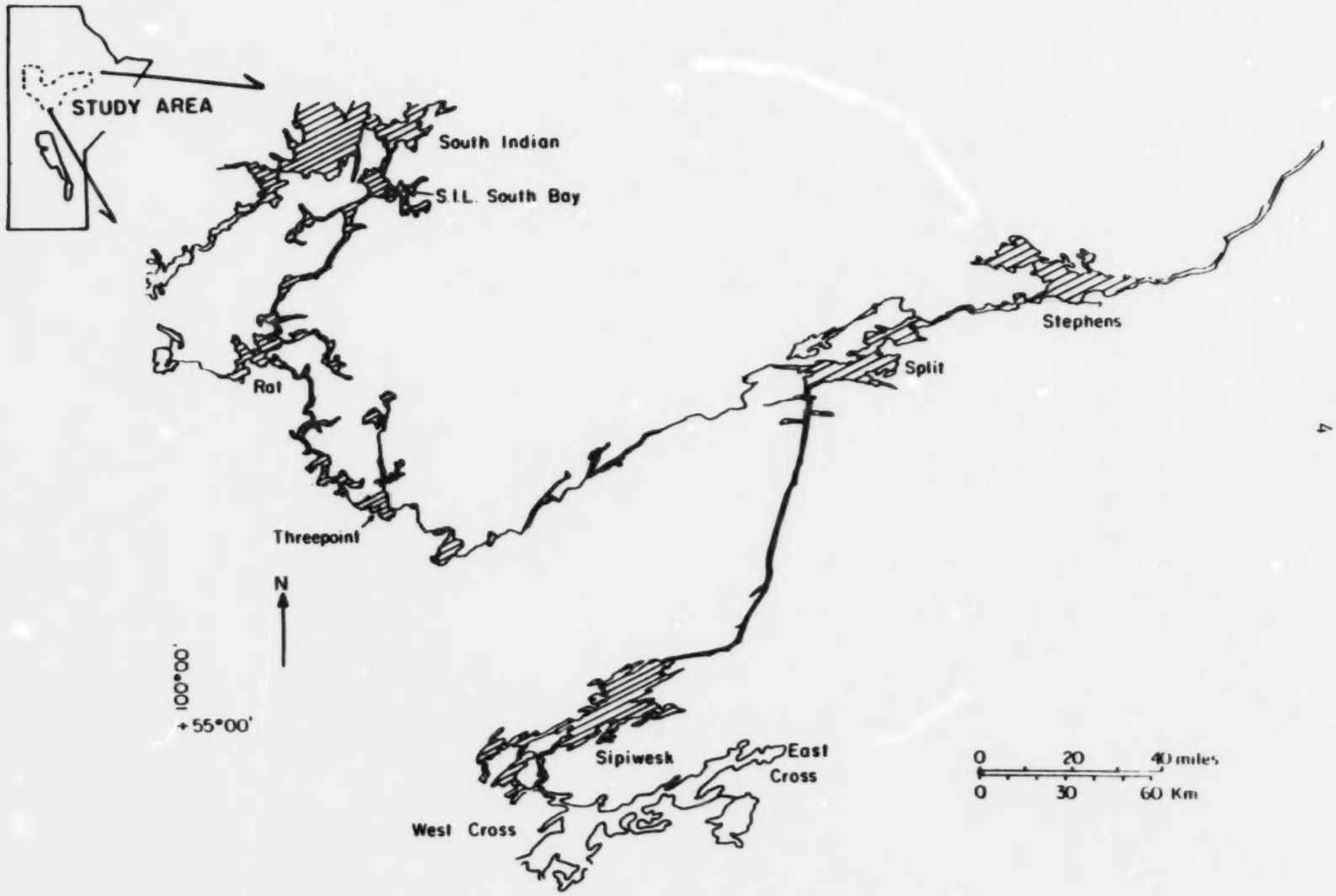

Fig. 1. Location of the six lakes sampled for net plankton, 1987-89.

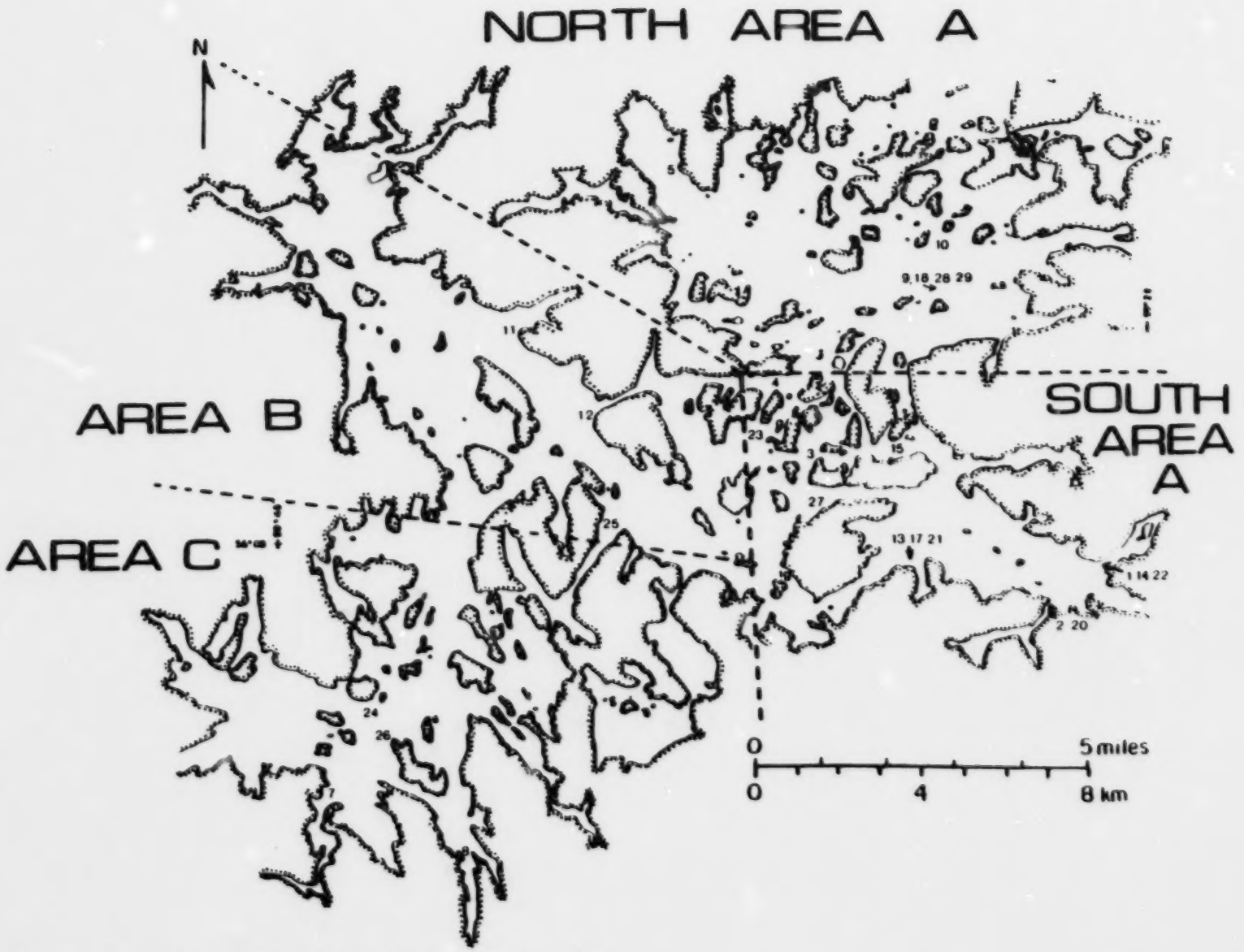

Fig. 2. Net plankton locations from Rat Lake, 1987.

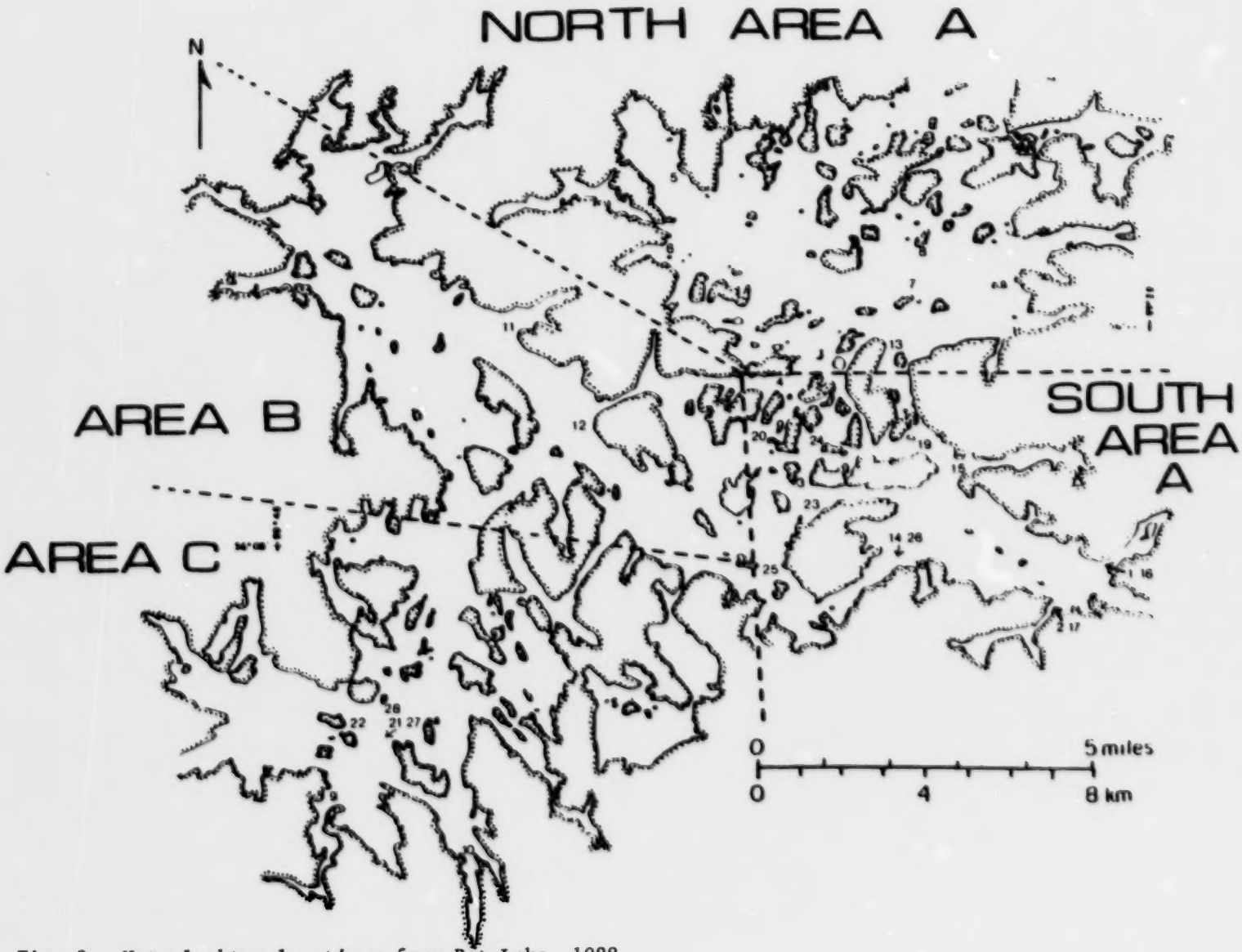

Fig. 3. Net plankton locations from Rat Lake, 1988.

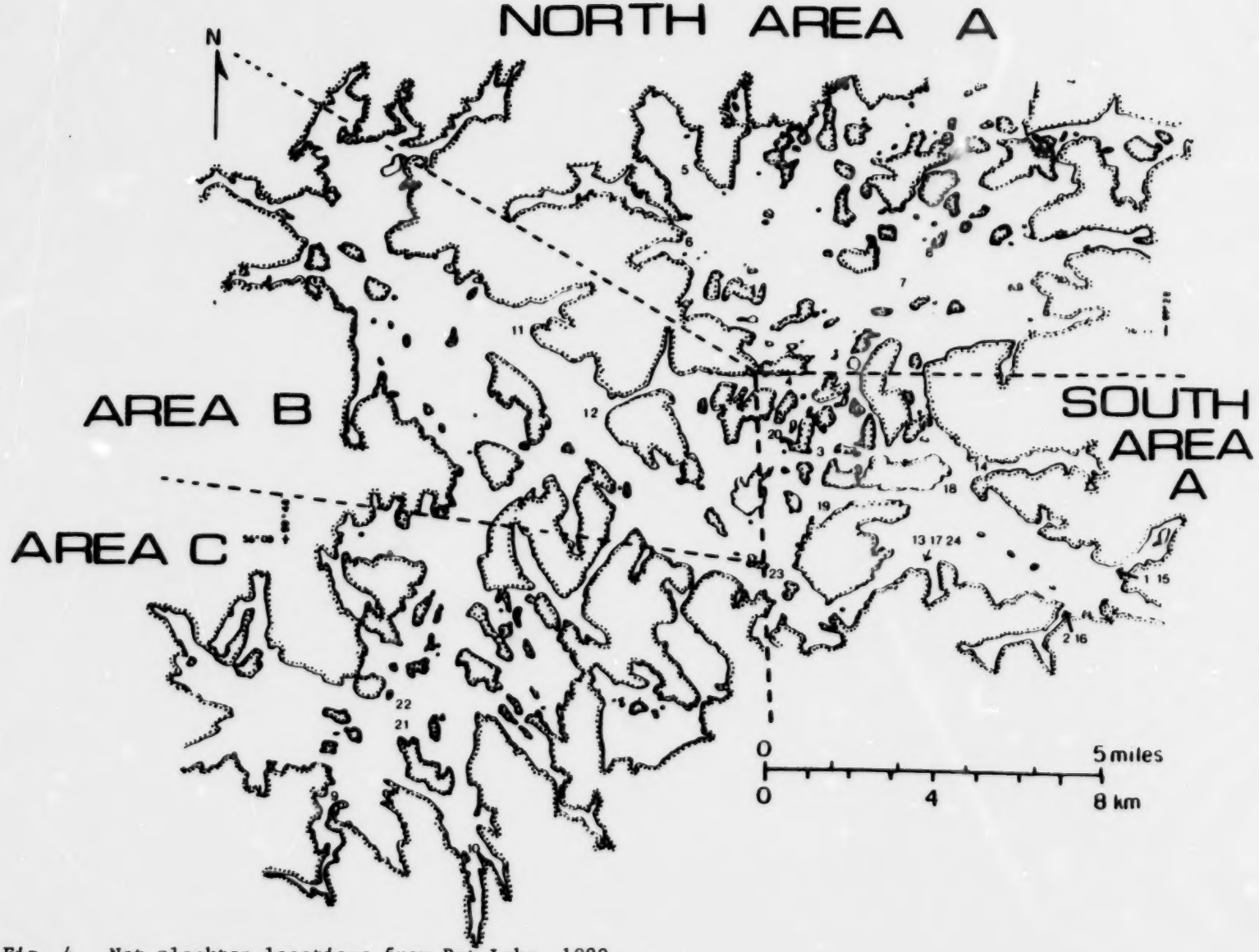

Fig. 4. Net plankton locations from Rat Lake, 1989.

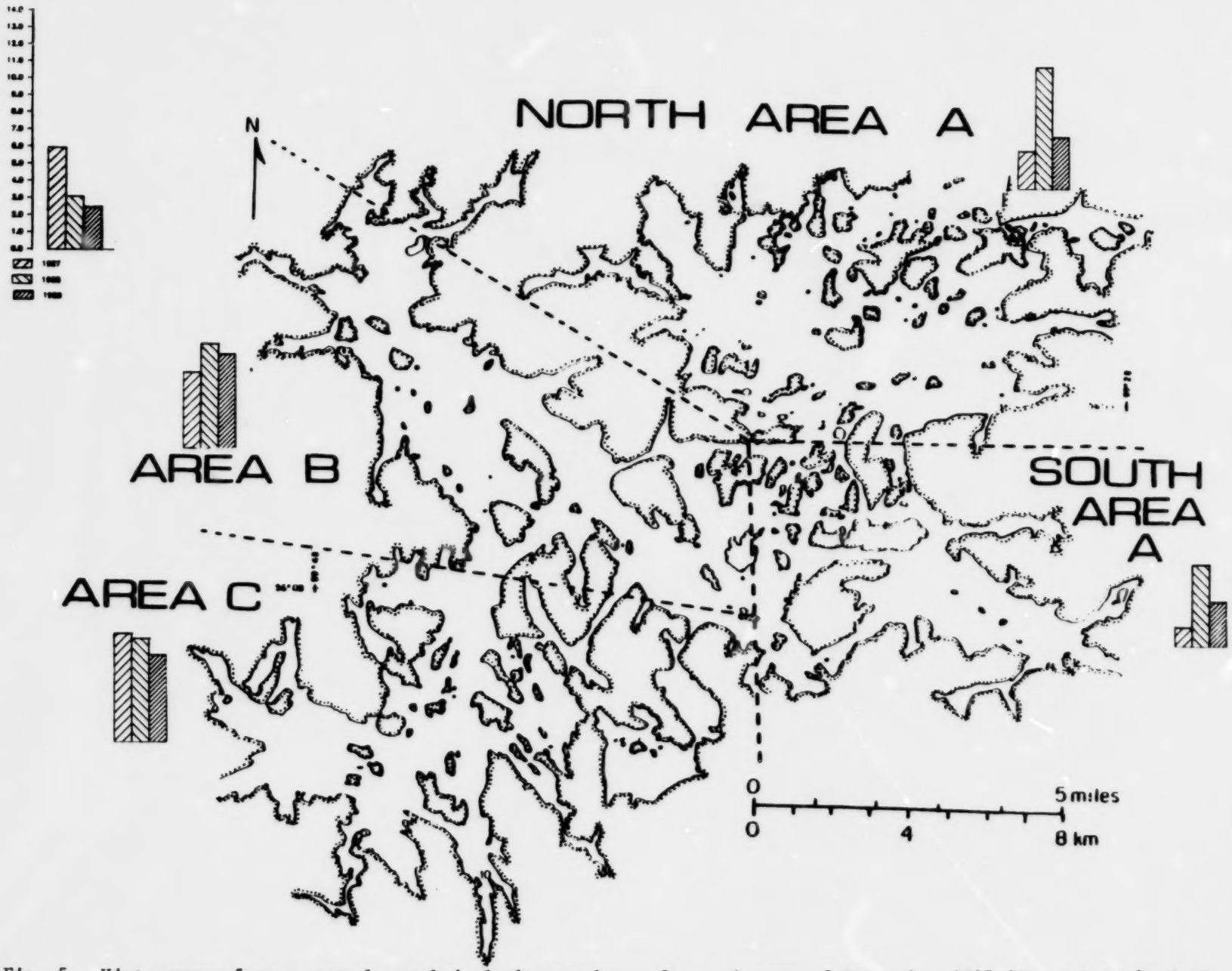

Fig. 5. Histograms of mean annual settled plankton volumes for each area of Rat Lake, 1987-89. A hypothetical histogram indicating common scale is in the upper left hand corner.

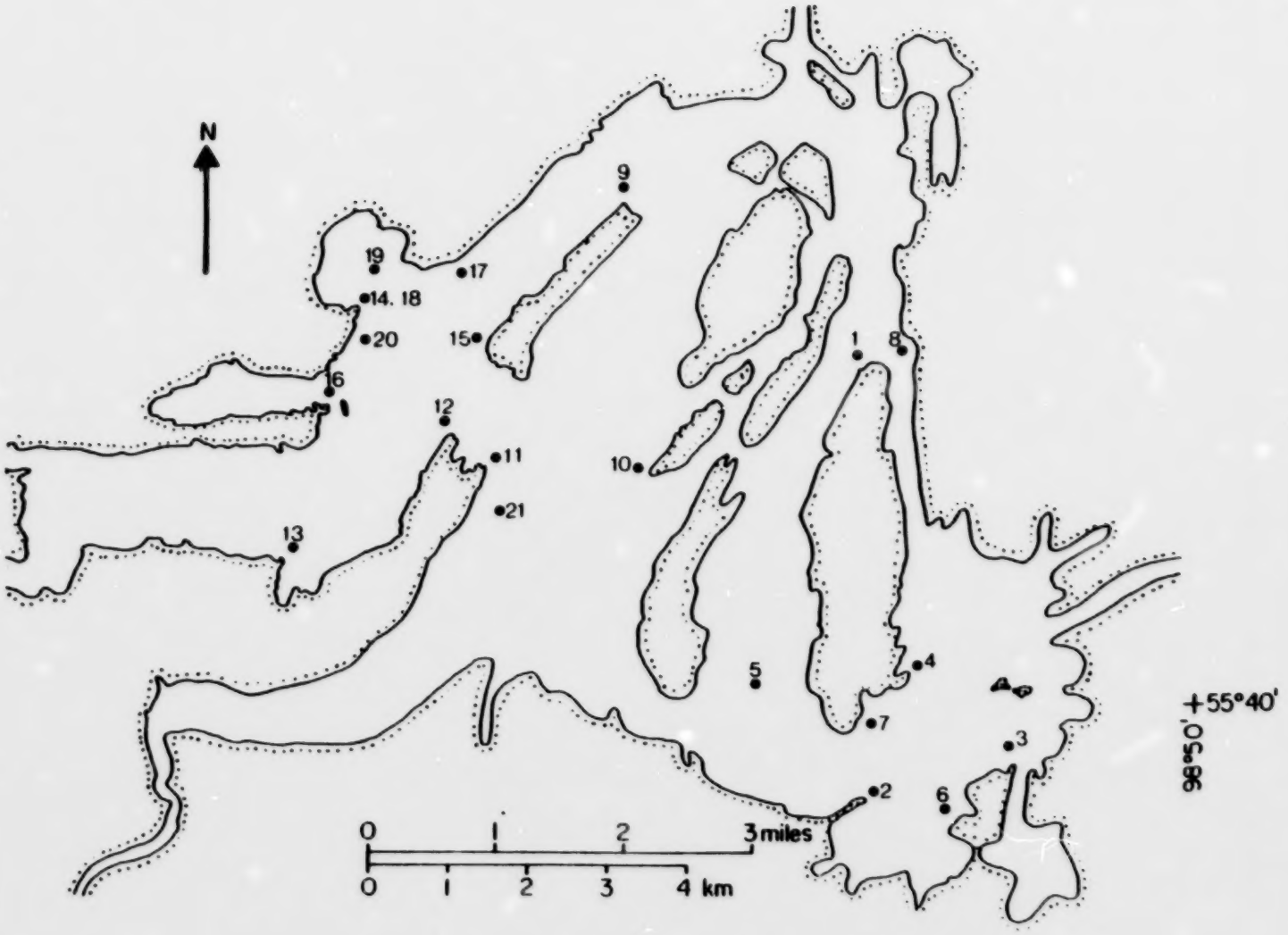

Fig. 6. Net plankton locations from Threepoint Lake, 1987.

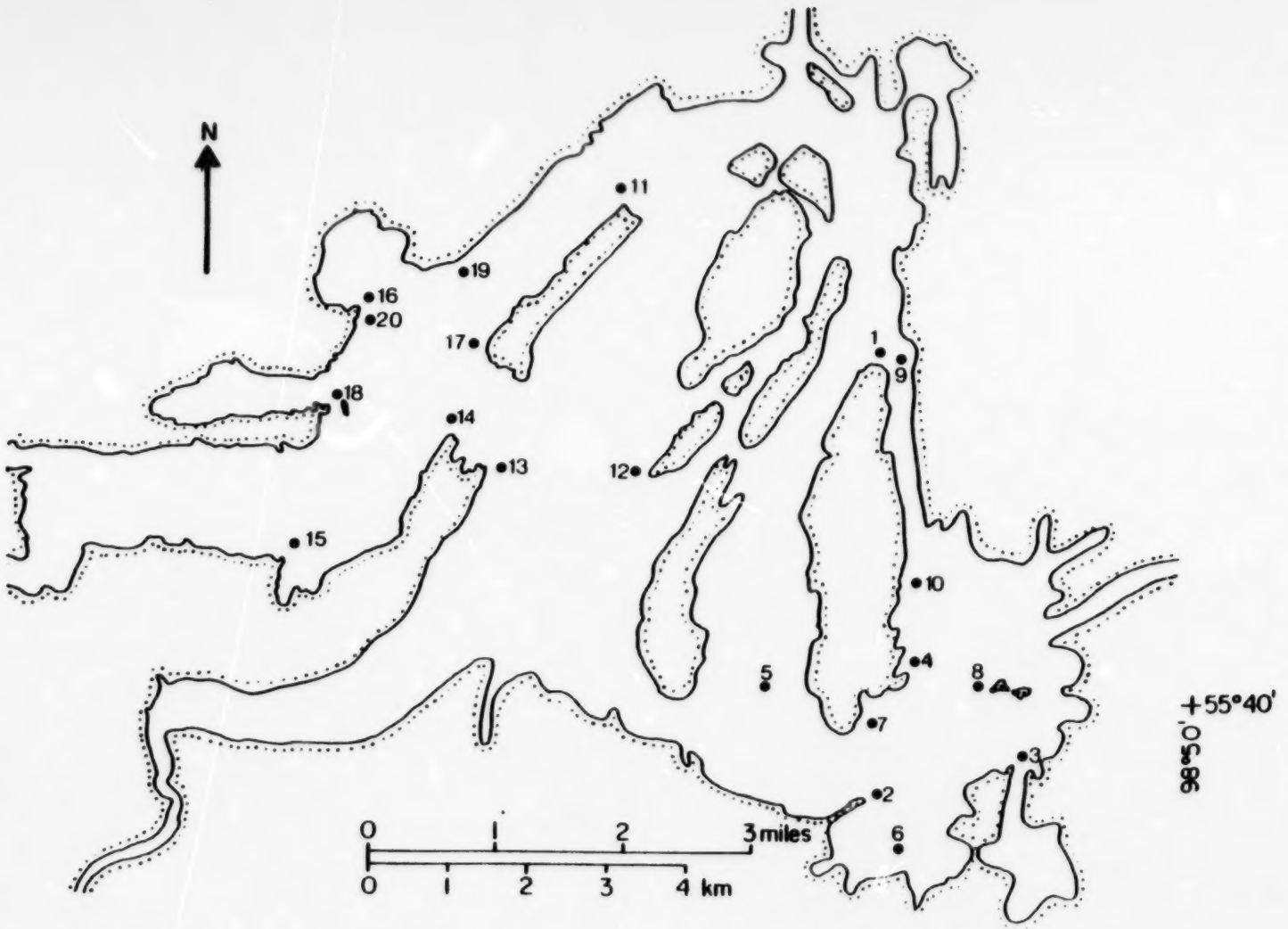

Fig. 7. Net plankton locations from Threepoint Lake, 1988.

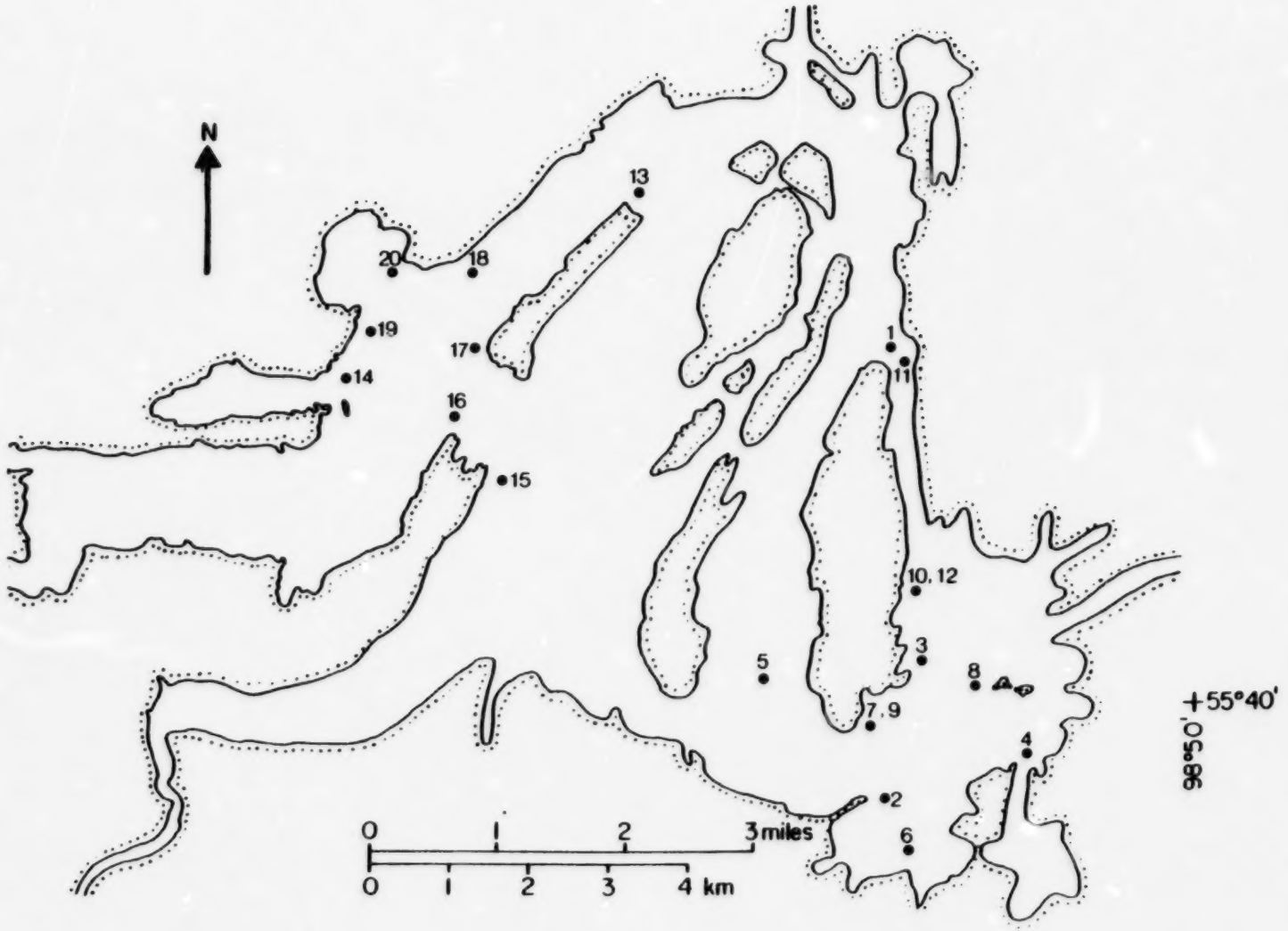

Fig. 8. Net plankton locations from Threepoint Lake, 1989. Plankton samples from locations 1-12 are not available.

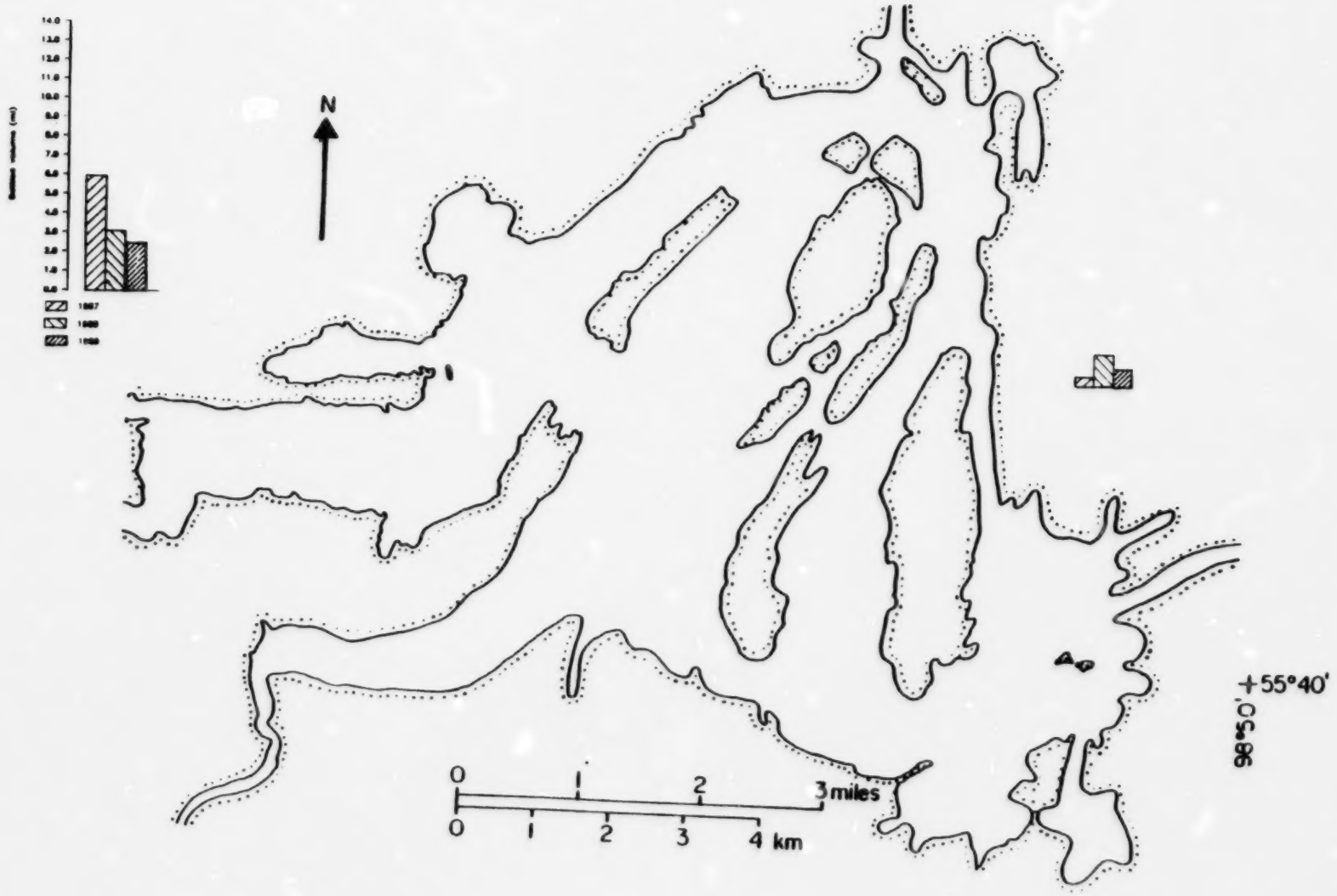

Fig. 9. Histograms of mean annual settled plankton volumes for Threepoint Lake, 1987-89. A hypothetical histogram indicating common scale is in the upper left hand corner.

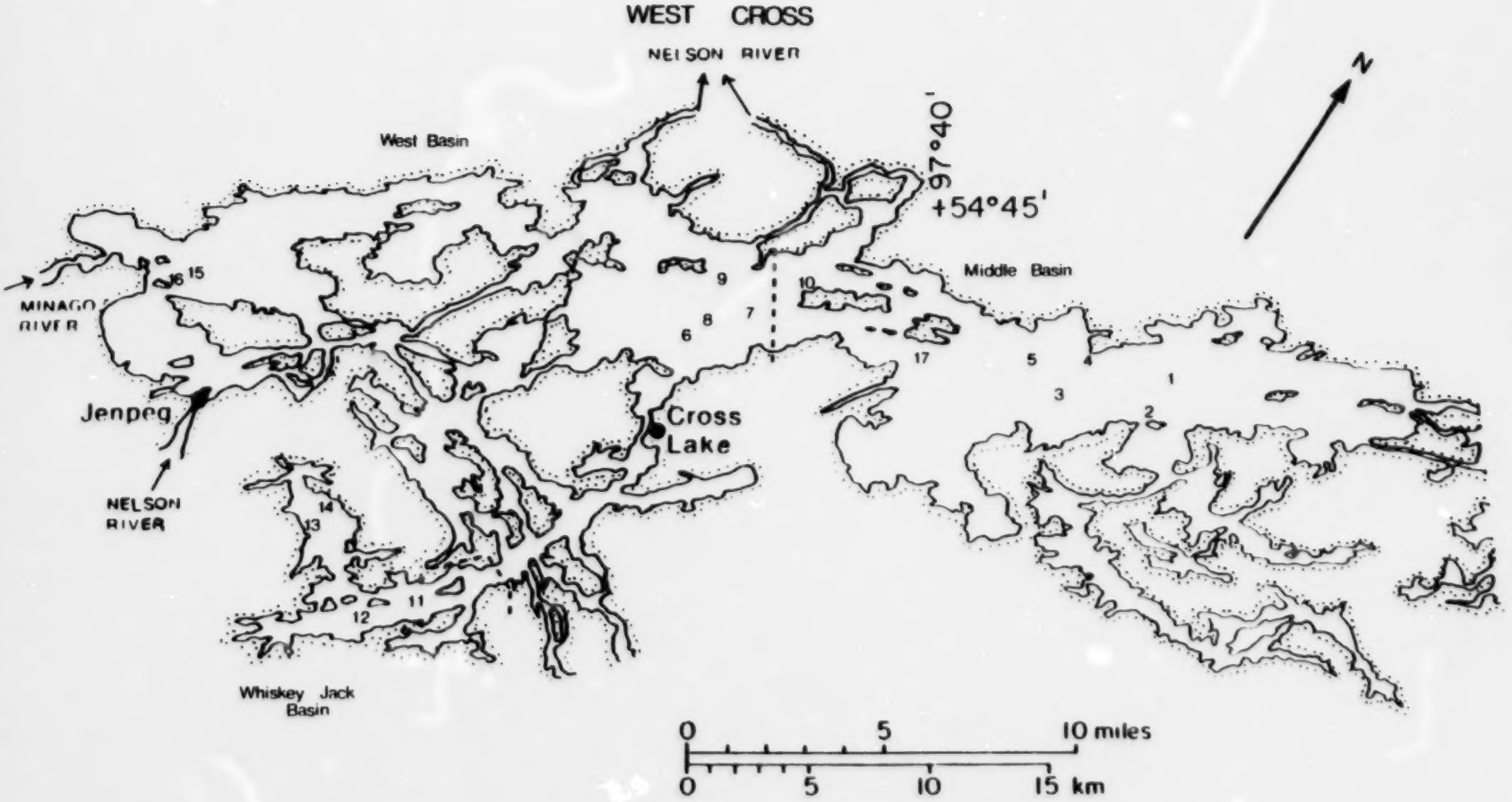

Fig. 10. Net plankton locations from West Cross Lake, 1987.

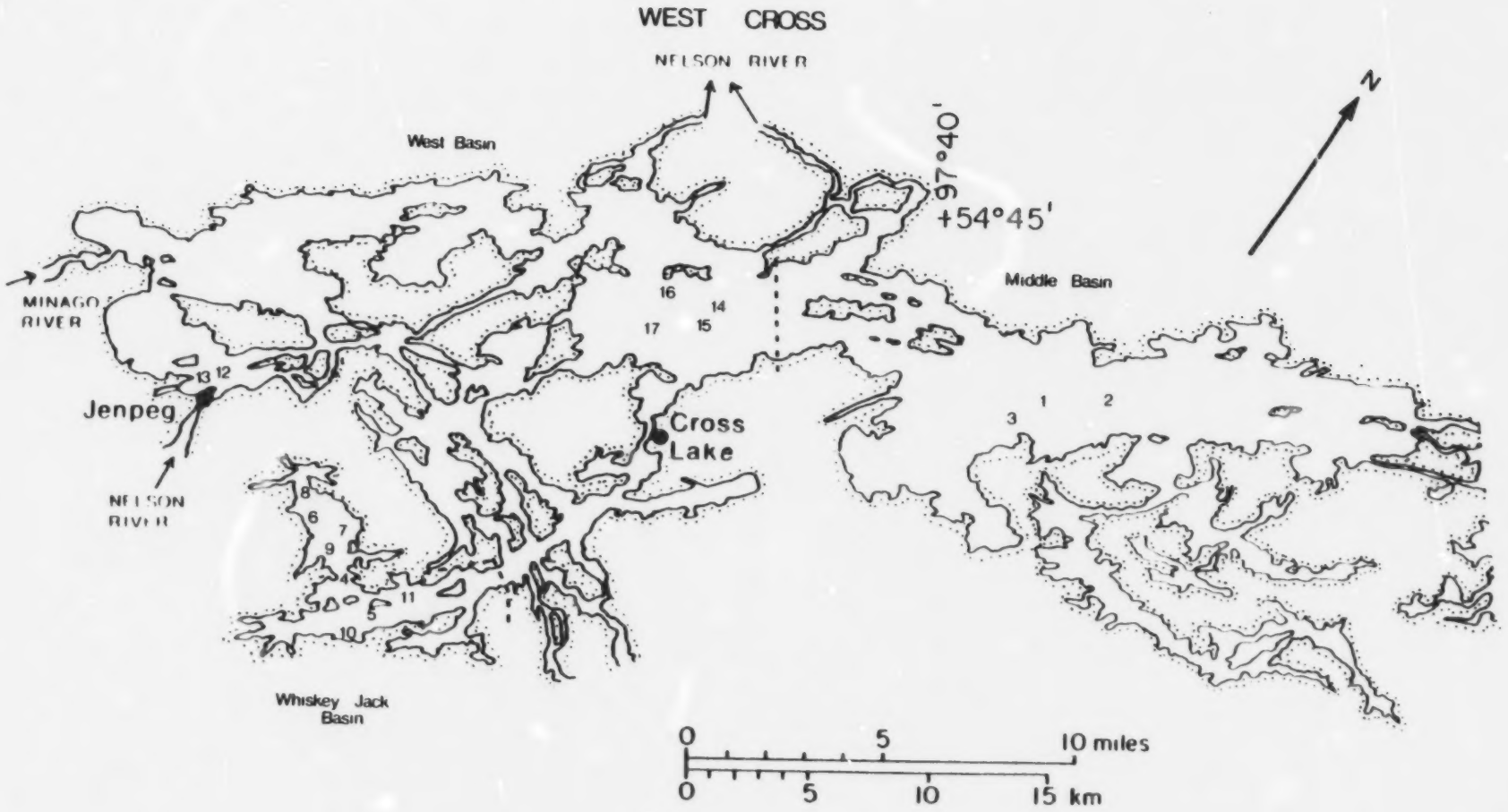

Fig. 11. Net plankton locations from West Cross Lake, 1988.

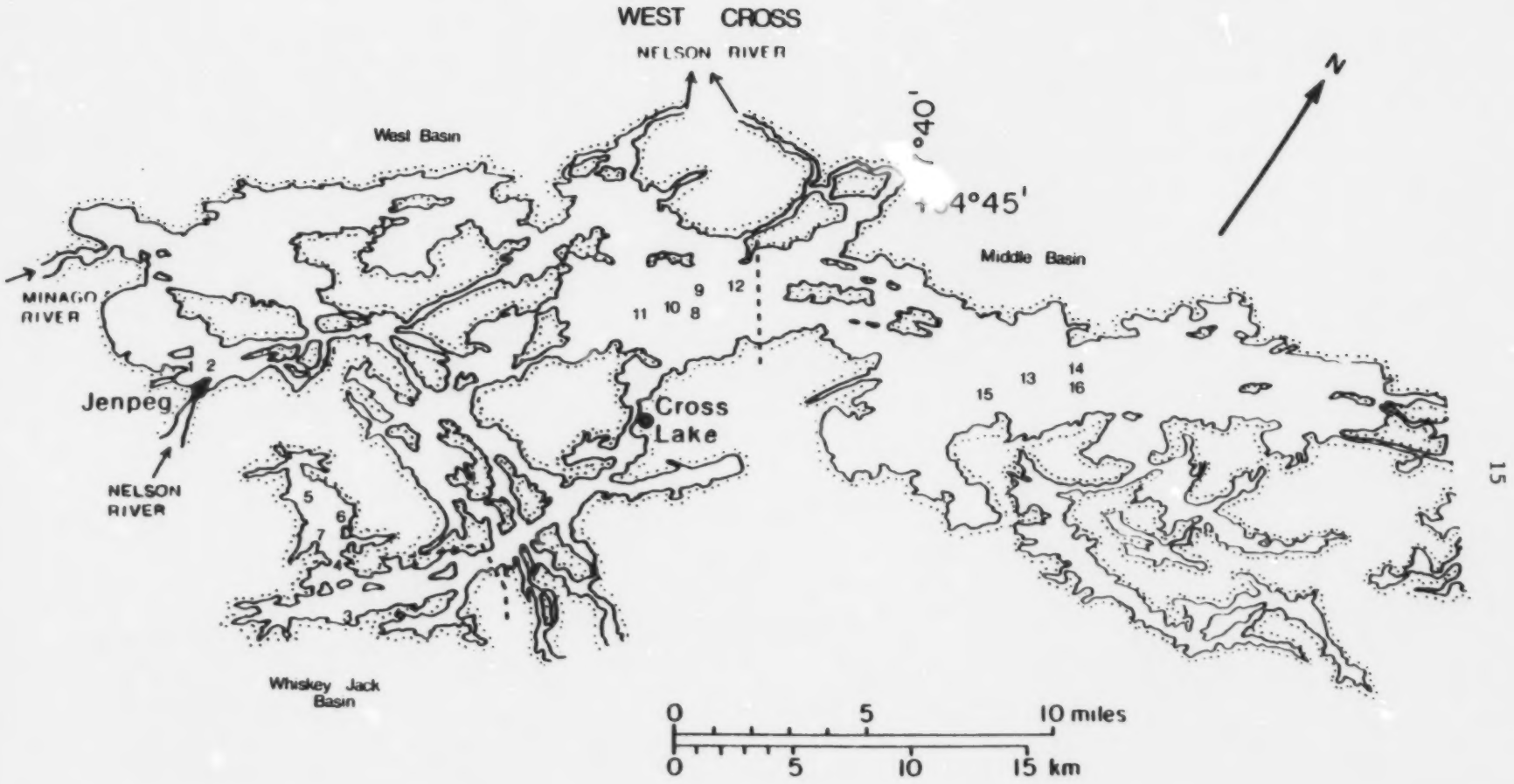

Fig. 12. Net plankton locations from West Cross Lake, 1989.

Fig. 13. Net plankton locations from East Cross Lake, 1987.

Fig. 14. Net plankton locations from East Cross Lake, 1988.

Fig. 15. No net plankton samples were taken from East Cross Lake, 1989.

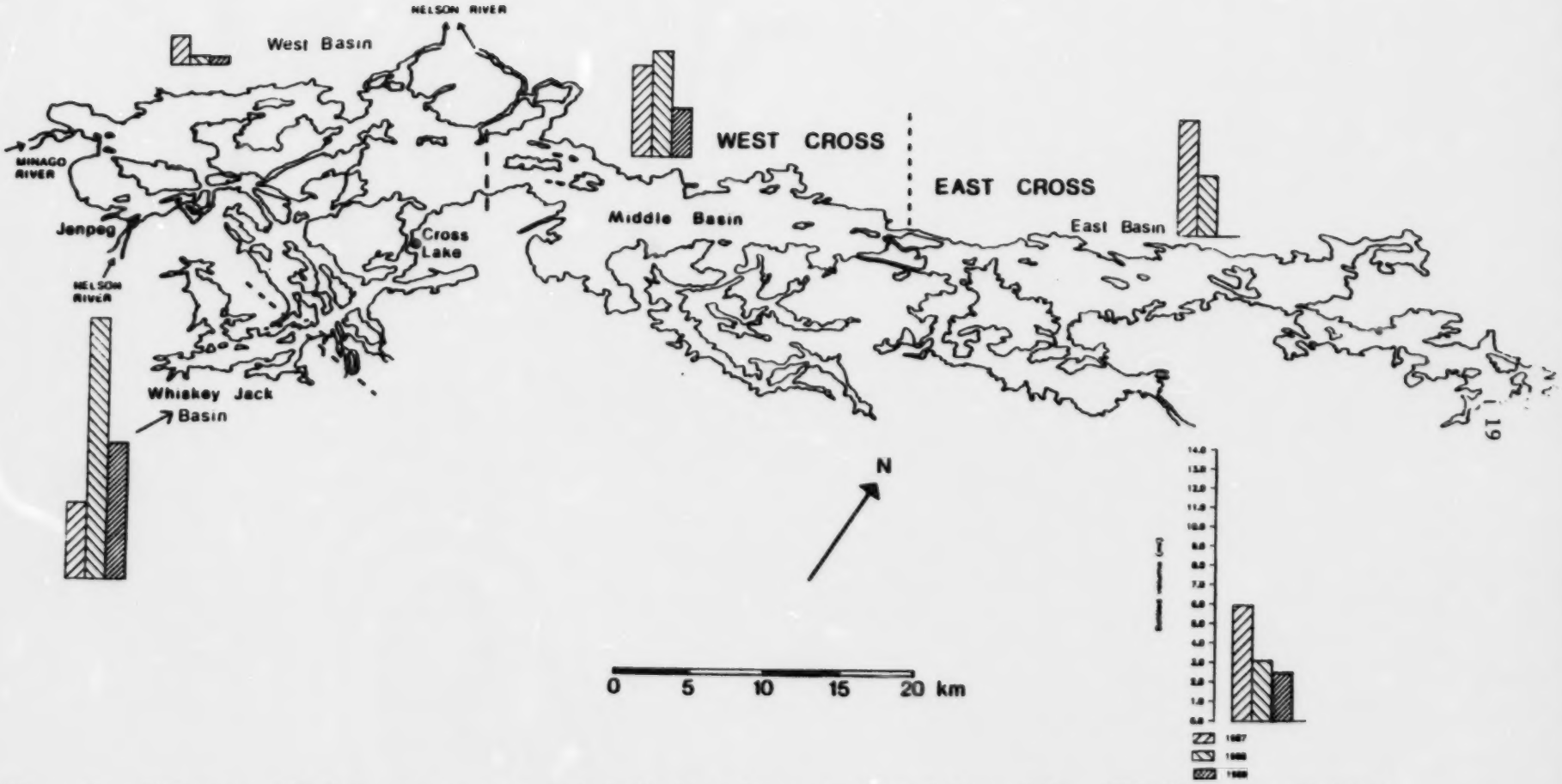

Fig. 16. Histograms showing mean annual settled plankton for each area of Cross Lake, 1987-89. A hypothetical histogram indicating common scale is in the lower right hand corner. Plankton samples were not collected from the East Basin in 1989 due to low water levels and hazards from surrounding forest fires.

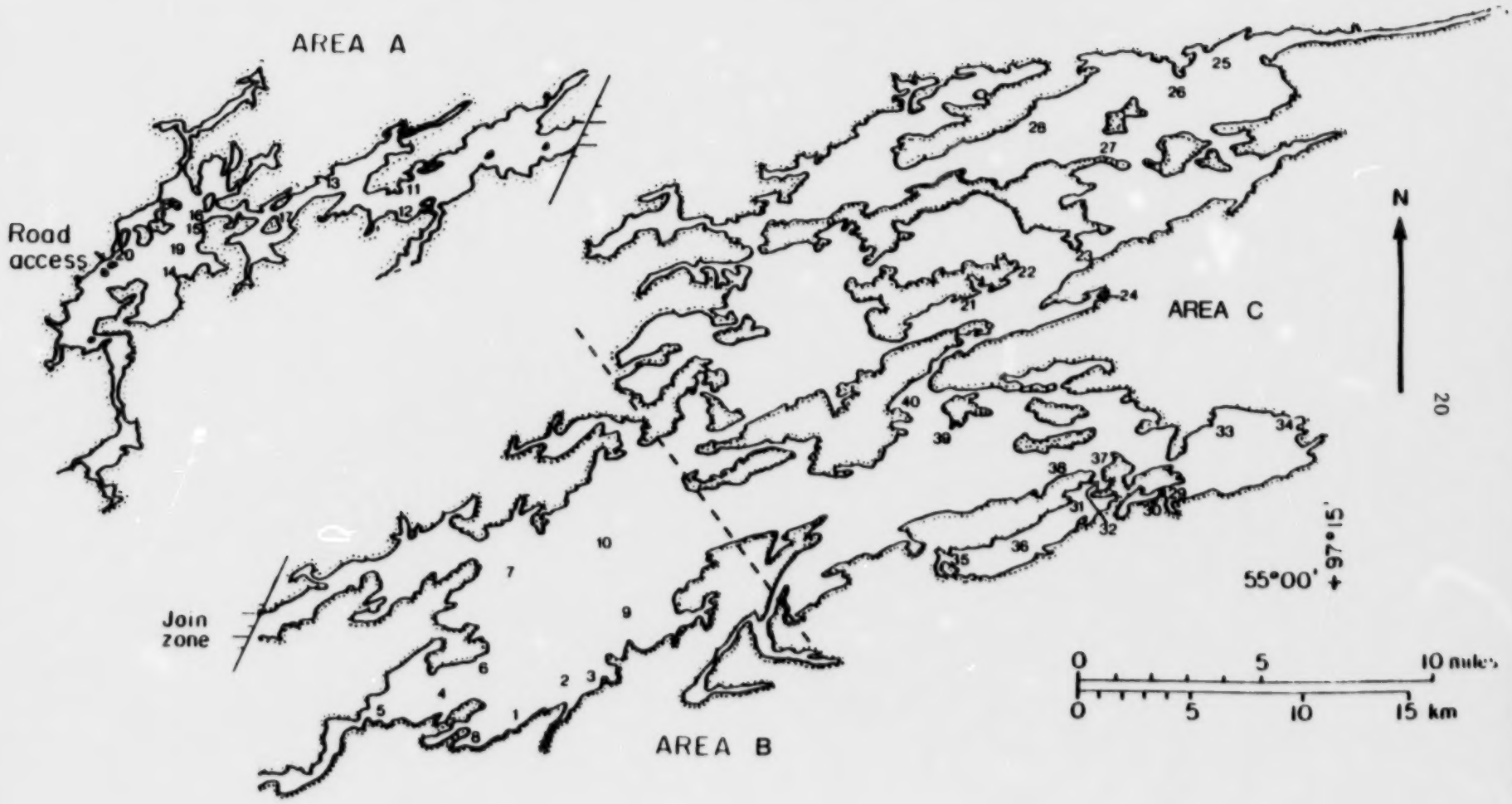

Fig. 17. Net plankton locations from Sipiwesk Lake, 1987.

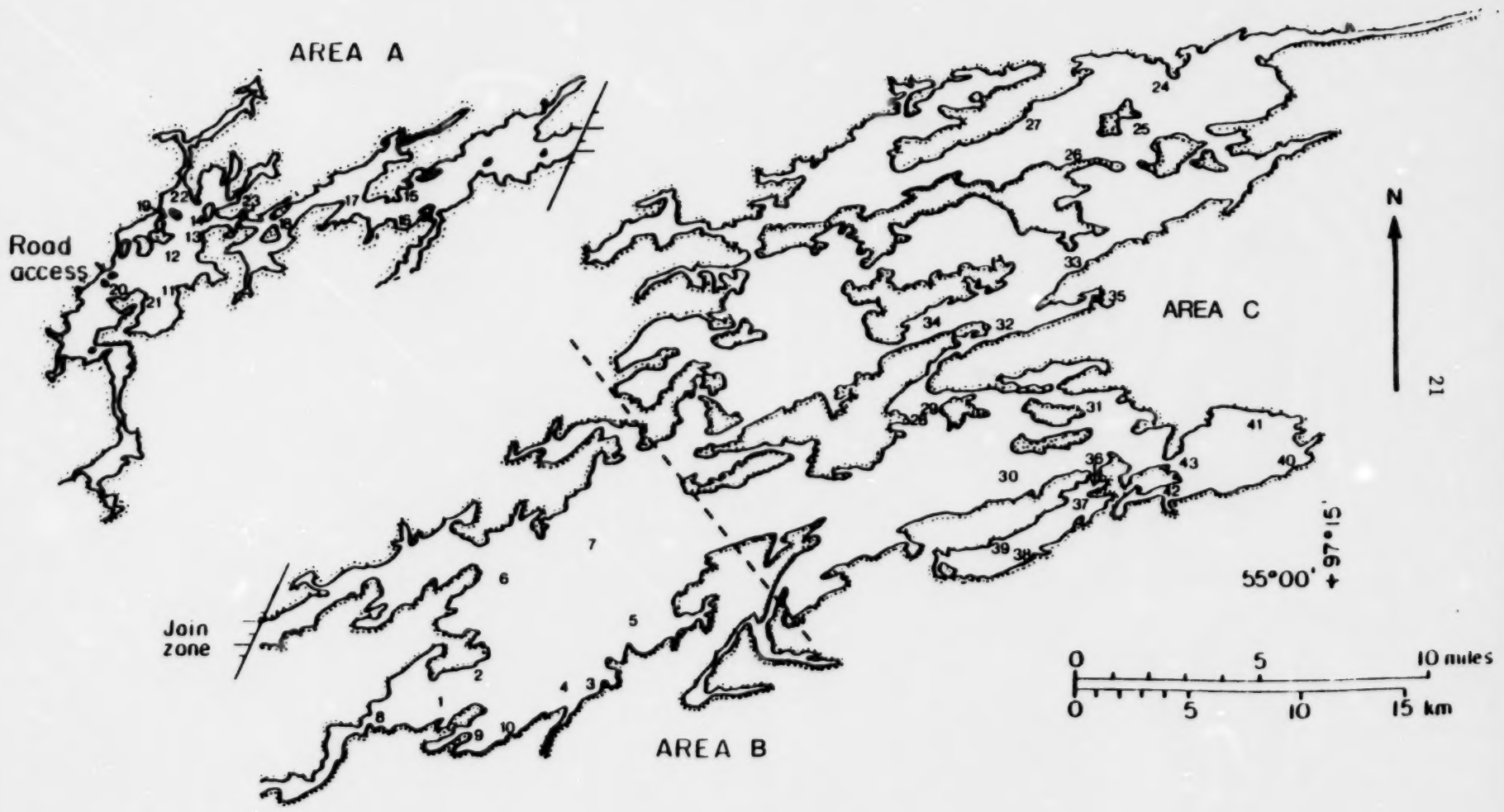

Fig. 18. Net plankton locations from Sipiwesk Lake, 1988.

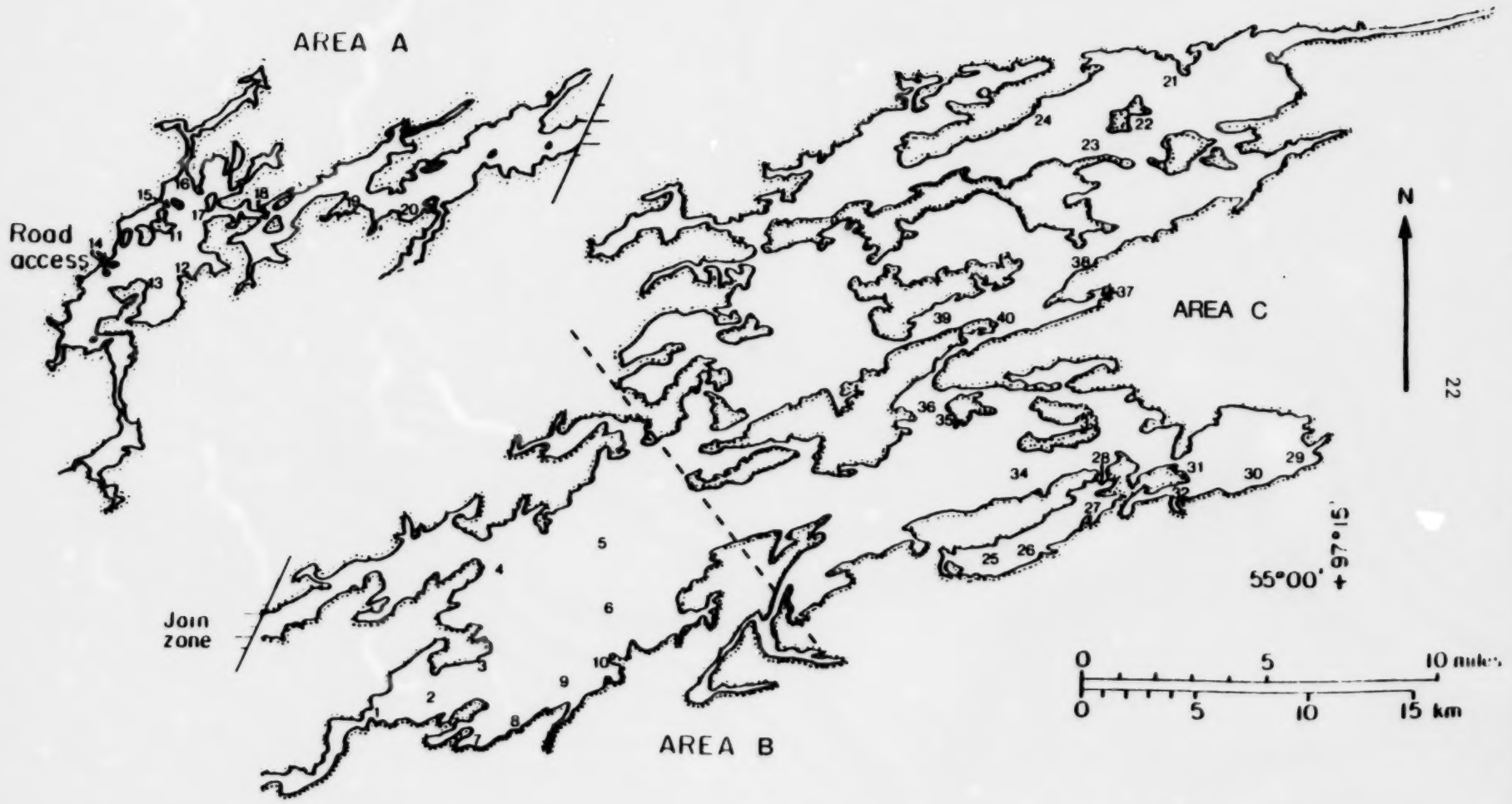

Fig. 19. Net plankton locations from Sipiwesk Lake, 1989.

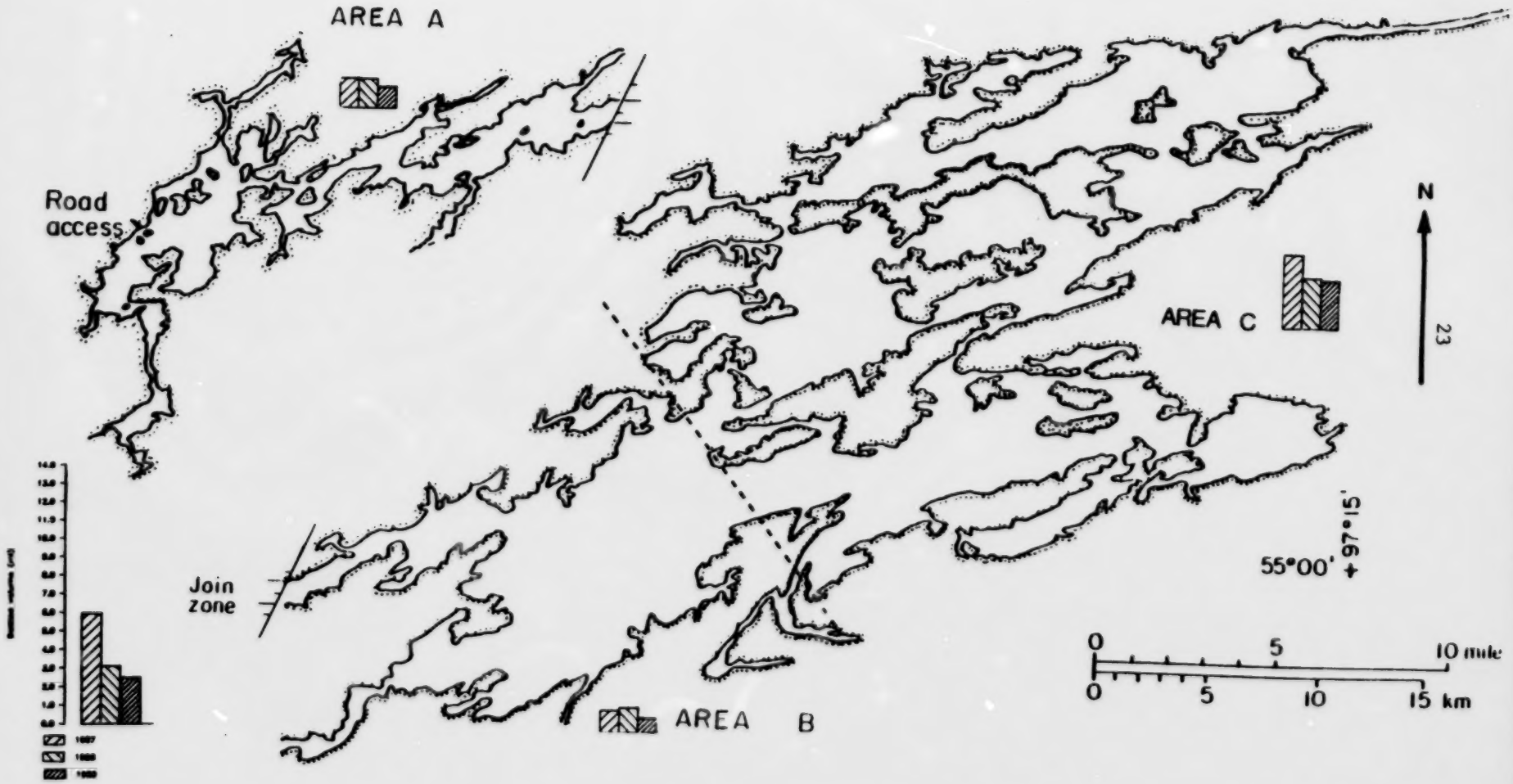

Fig. 20. Histograms showing mean annual settled plankton volumes for each area of Sipiwesk Lake, 1987-89. A hypothetical histogram indicating common scale is in lower left hand corner.

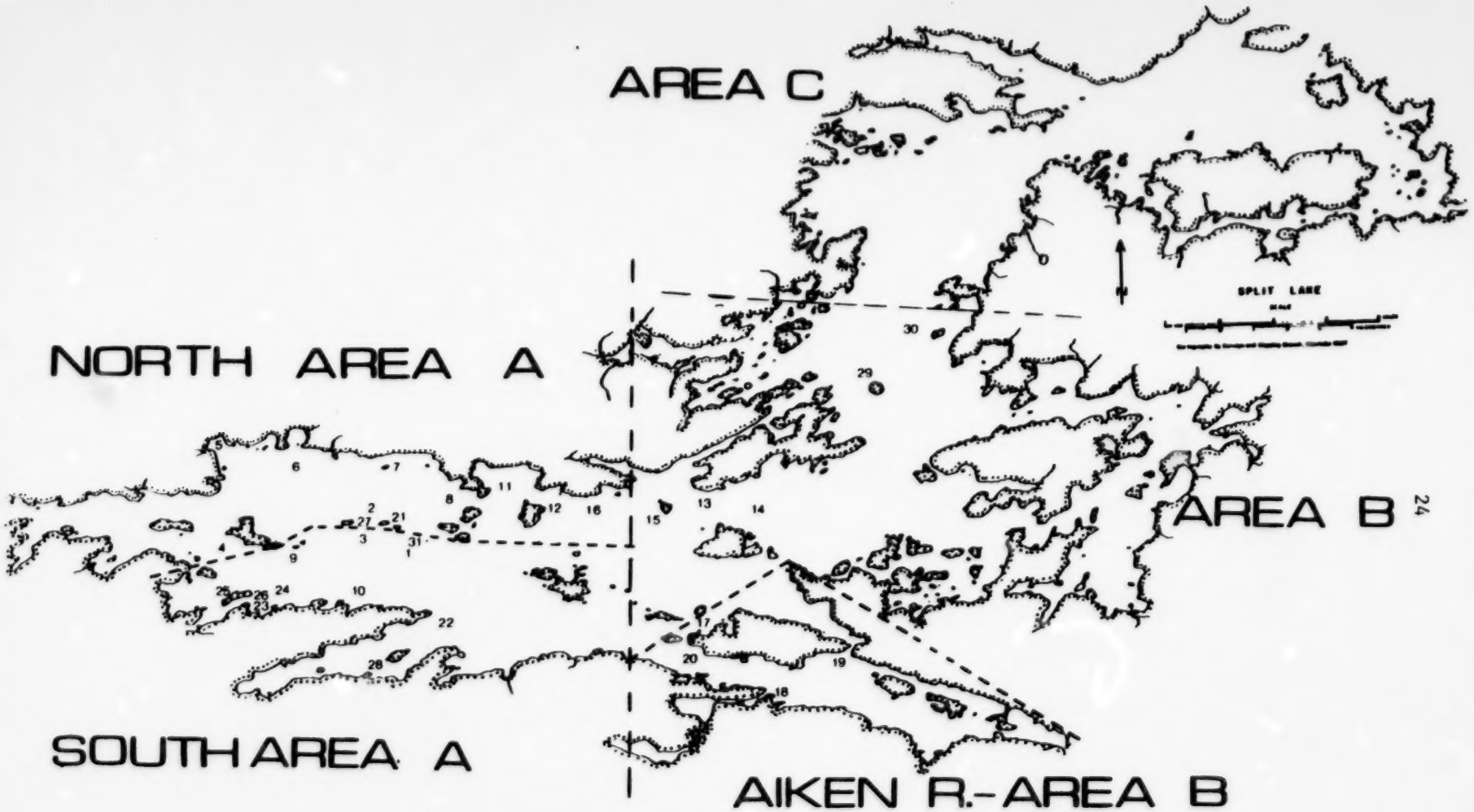

Fig. 21. Net plankton locations from Split Lake, 1987.

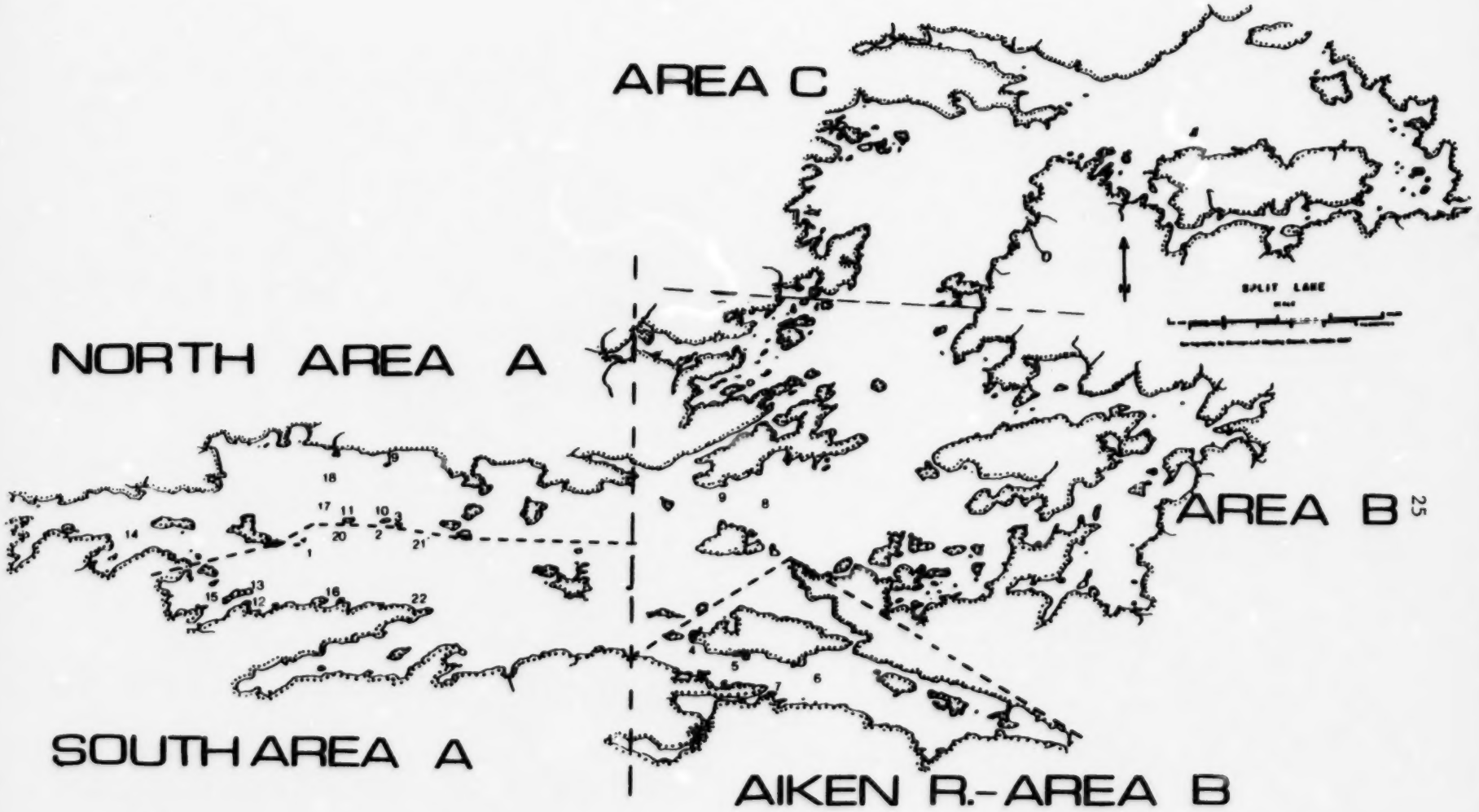

Fig. 22. Net plankton locations from Split Lake, 1988.

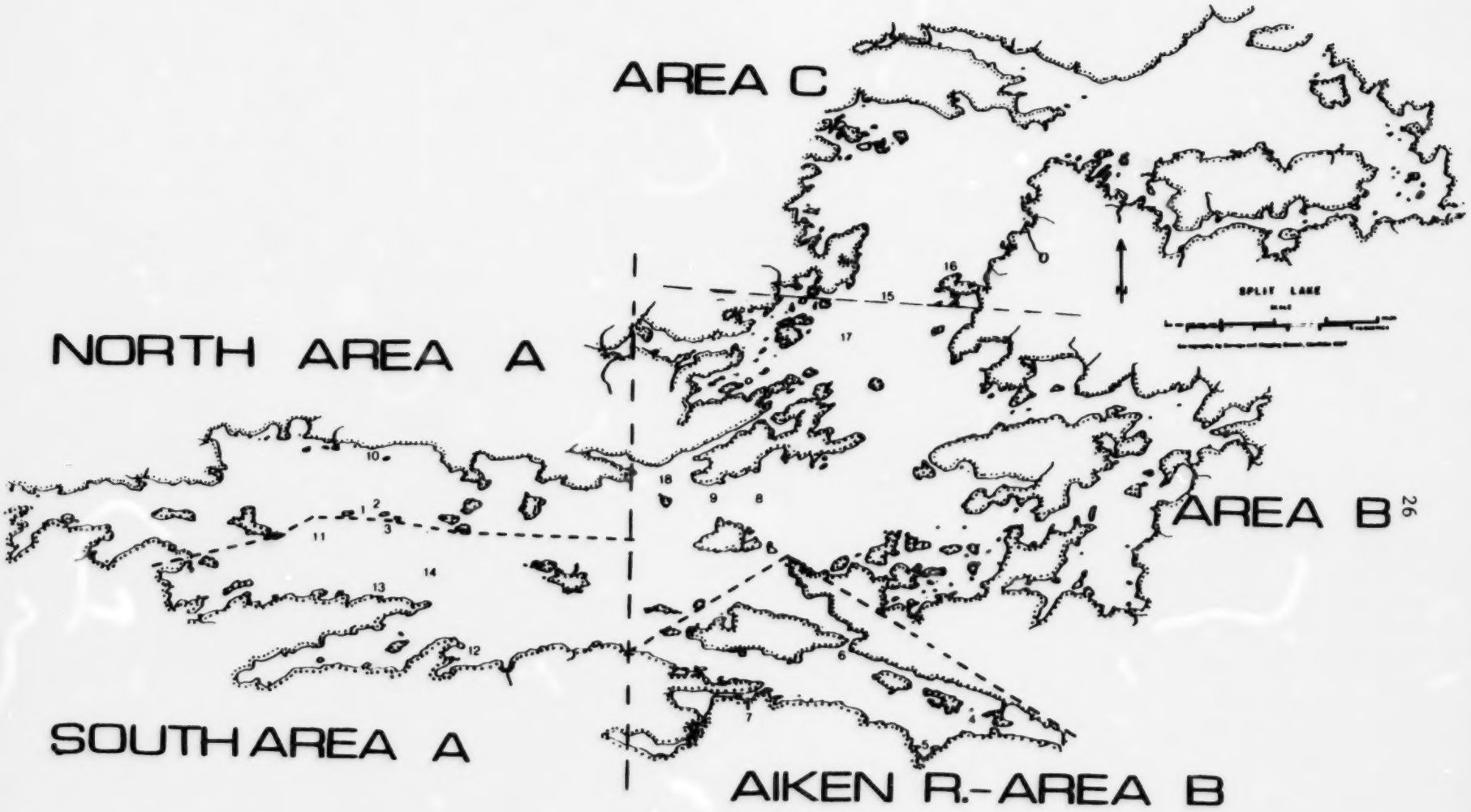

Fig. 23. Net plankton locations from Split Lake, 1989.

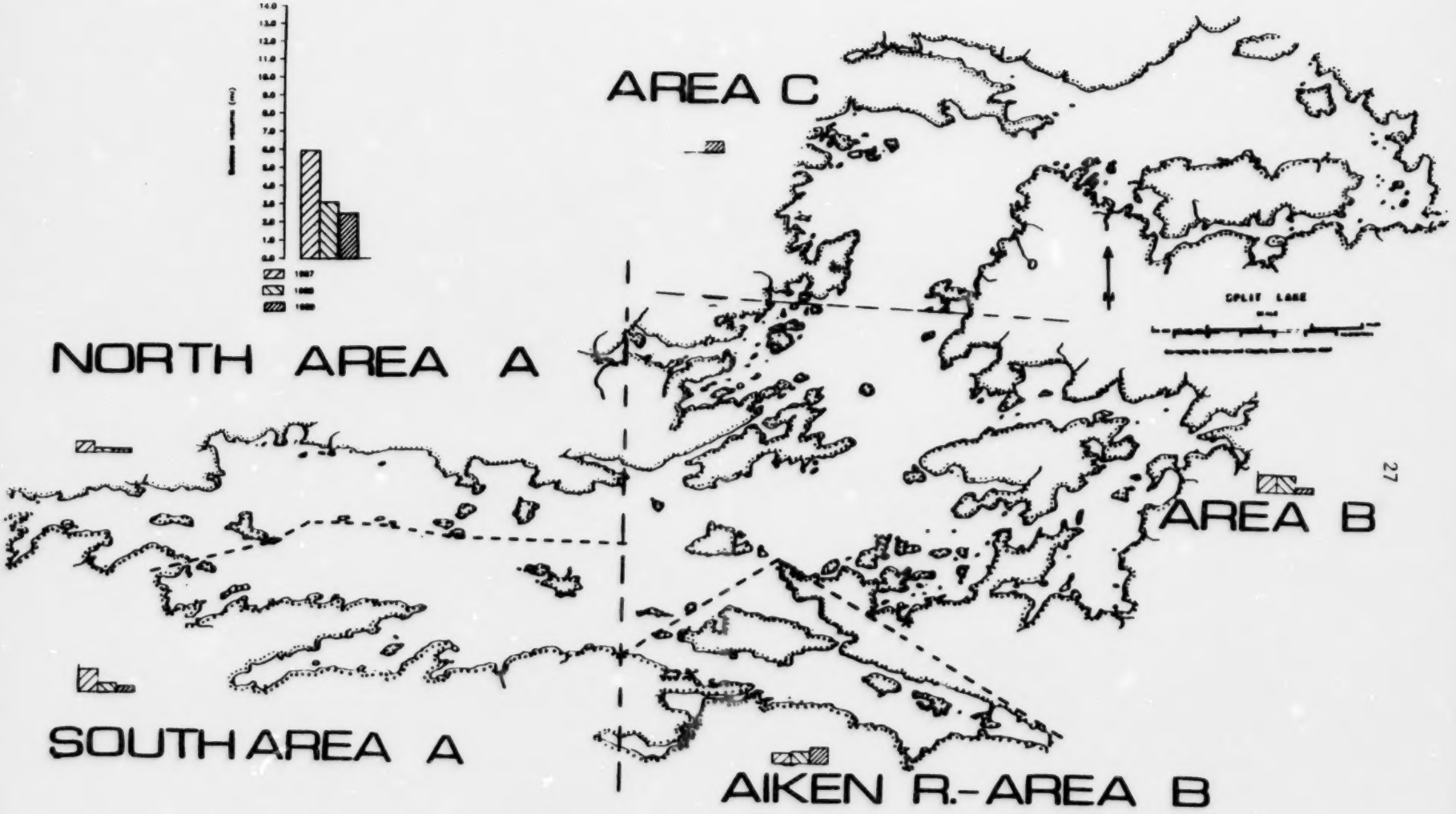

Fig. 24. Histograms of mean annual settled plankton volumes for each area of Split Lake, 1987-89. A hypothetical histogram indicating common scale is in the upper left hand corner. Plankton samples were not collected in area C in 1987 & 1988.

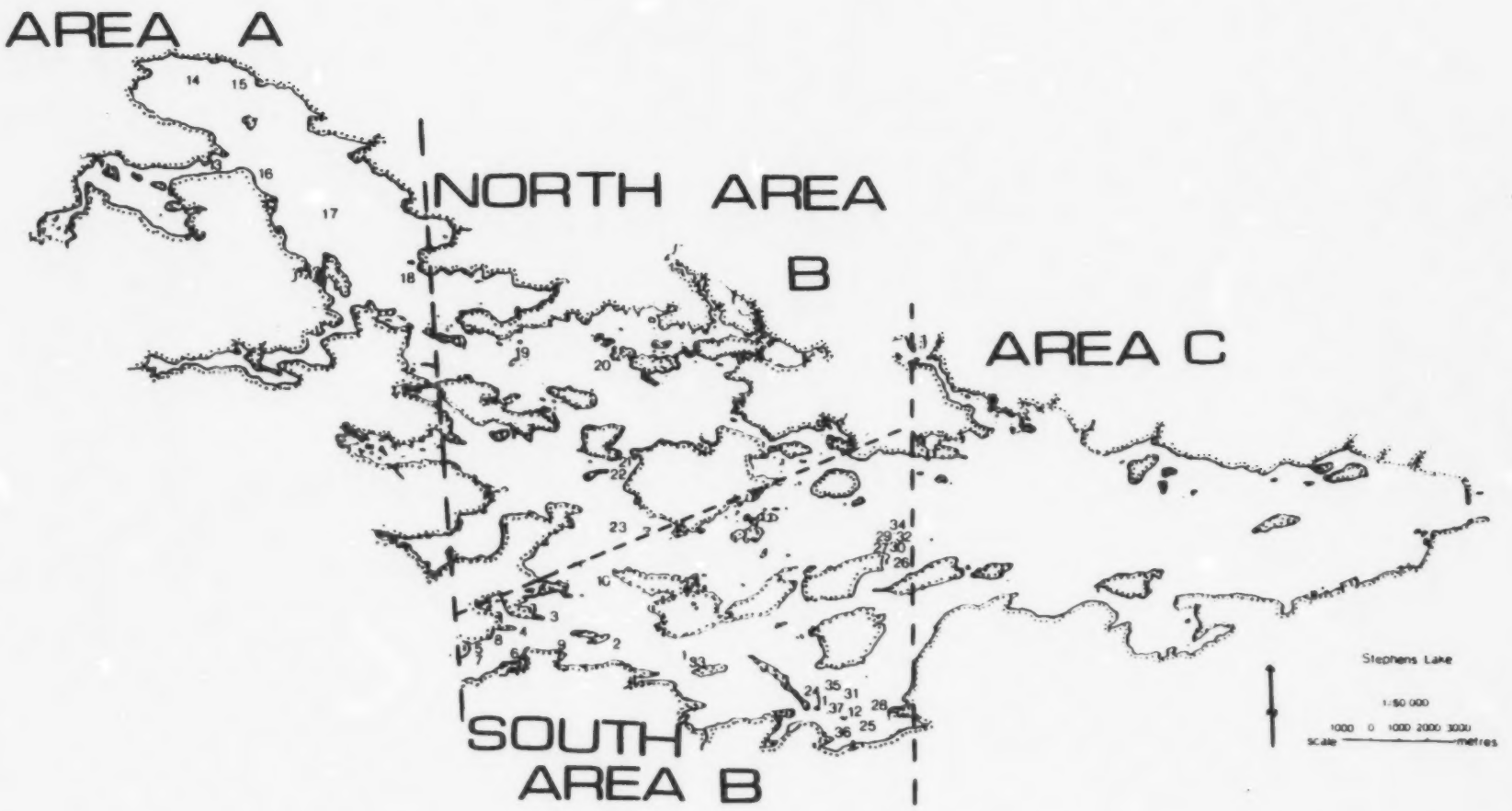

Fig. 25. Net plankton locations from Stephens Lake, 1987.

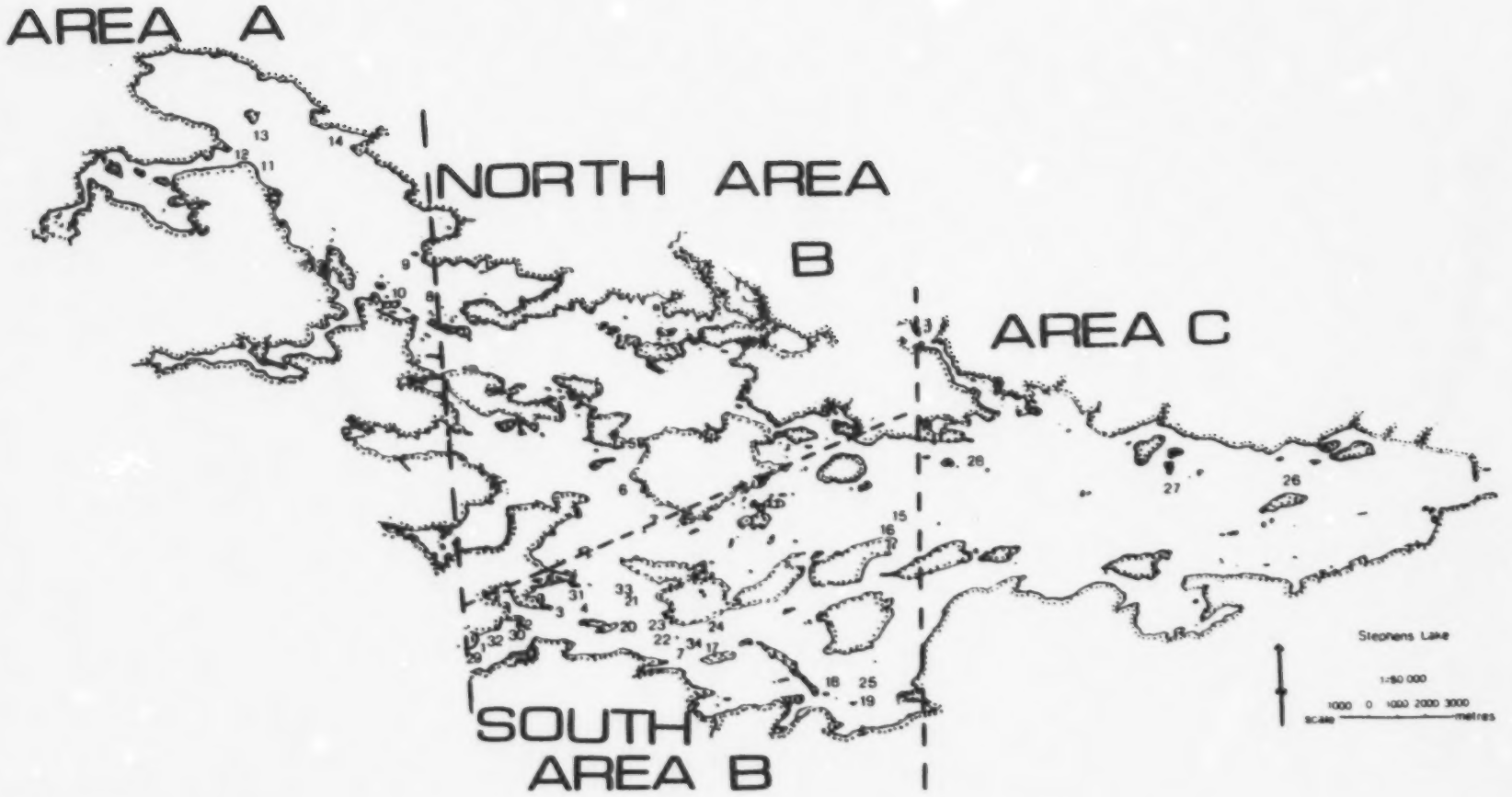

Fig. 26. Net plankton locations from Stephens Lake, 1988.

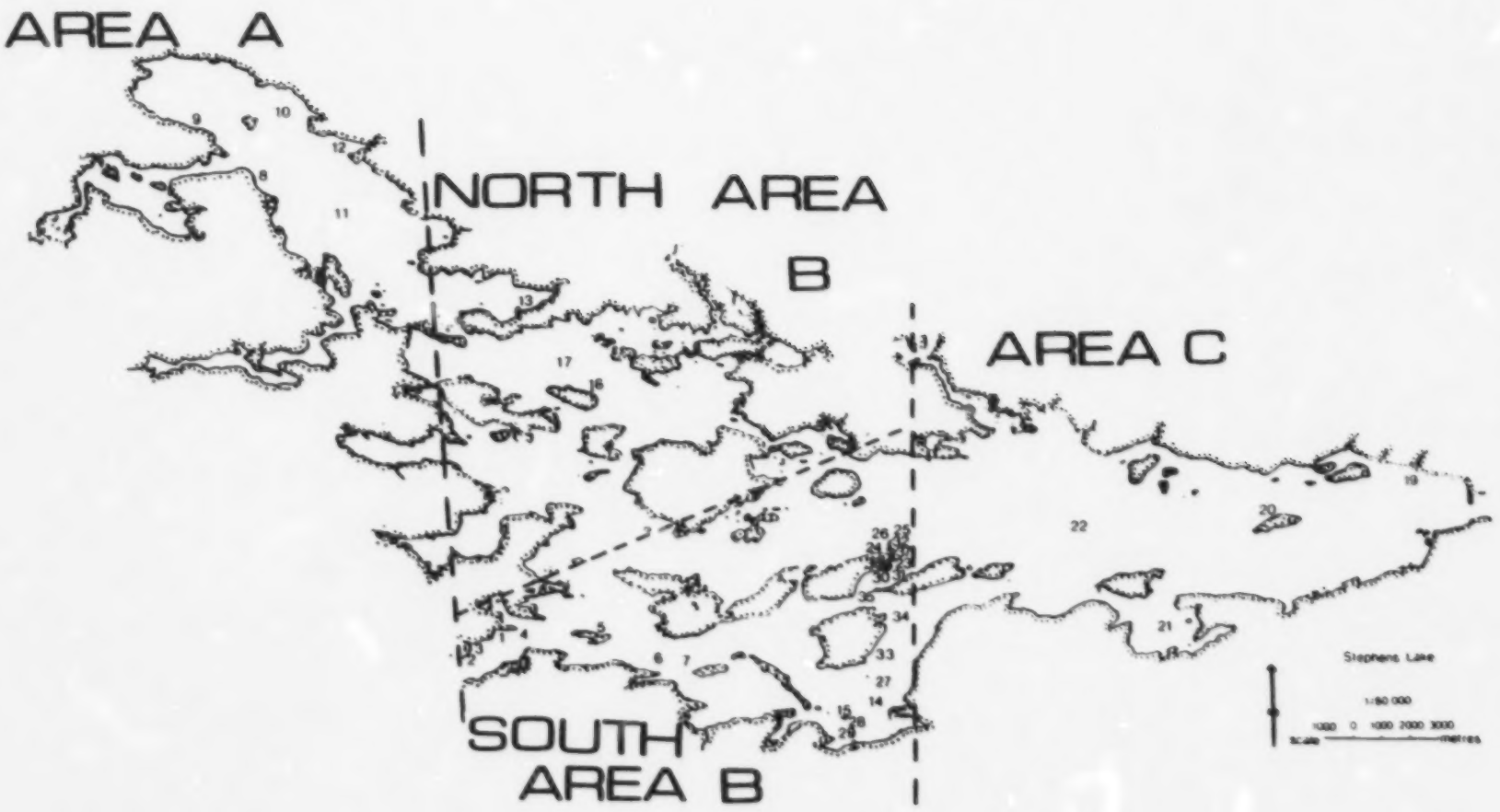

Fig. 27. Net plankton locations from Stephens Lake, 1989.

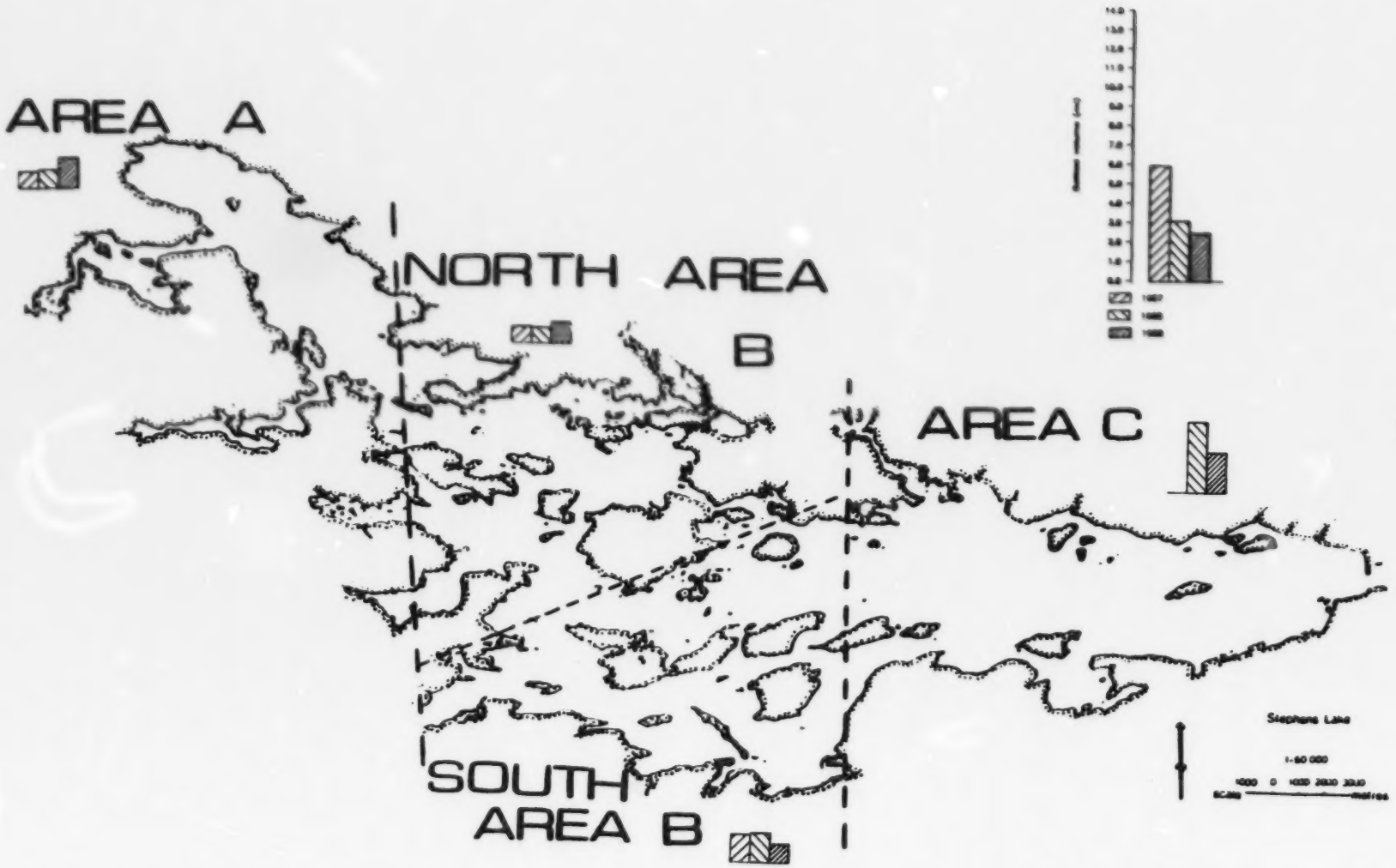

Fig. 28. Histograms showing mean annual settled plankton volumes for each area of Stephens Lake, 1987-89. A hypothetical histogram indicating common scale is in the upper right hand corner. Plankton samples were not collected from Area C in 1987.

ACKNOWLEDGEMENTS

I would like to express my appreciation to D. Green and A. Derksen for their suggestions towards and editing this report. The field data was collected by G. Chartrand, B. Cherepak, A. Derksen, K. Francois, D. Green, I. Hagenson, K. Martinussen, L. Mohr, J. Patalas, M. Patterson, J. Vermette and B. Yetman. Special thanks to Jeanette Forte for typing the manuscript.

REFERENCES

Bajkov, A. 1930. Fishing industry and fisheries investigations in the prairie provinces. Trans. Amer. Fish. Soc. 60:215-217.

Green, D. J. 1987. Summary of fish population data from Rat and Threepoint lakes, 1987. Man. Dept. Nat. Res., Fish. Br. MS Report No. 88-11, 55 pp.

_____. 1988. Summary of fish population data from Rat and Threepoint lakes, 1988. Man. Dept. Nat. Res., Fish. Br. MS Report No. 89-13, 69 pp.

_____. 1990. Summary of fish population data from Rat and Theepoint lakes, 1989. Man. Dept. Nat. Res., Fish. Br. MS Report No. 90-05, 74 pp.

_____. 1988. Summary of fish population data from Sipiwesk and Cross lakes, 1987. Man. Dept. Nat. Res., Fish. Br. MS Report No. 88-12, 90 pp.

_____. 1989. Summary of fish population data from Sipiwesk and Cross lakes, 1988. Man. Dept. Nat. Res., Fish. Br. MS Report No. 89-11, 91 pp.

_____. 1990. Summary of fish population data from Sipiwesk and Cross lakes, 1989. Man. Dept. Nat. Res., Fish. Br. MS Report No. 90-06, 72 pp.

Hagenson, I. 1988. Fish population data from Split and Stephens lakes, 1987. Man. Dept. Nat. Res., Fish Br. MS Report No. 88-15, 66 pp.

_____. 1989. Fish population data from Split and Stephens lakes, 1988. Man. Dept. Nat. Res., Fish. Br. MS Report No. 89-16, 72 pp.

_____. 1990. Fish population data from Split and Stephens lakes, 1989. Man. Dept. Nat. Res., Fish. Br. In press.

Welch, P.S. 1948. Limnological methods. 381 pp. McGraw-Hill Book Company, Inc.

Appendix A1. Net plankton data for Rat Lake, 1987-89

RAT LAKE 1987

Month/day	Set No.	Depth (m)	Transparency secchi (cm)	Settled volume (ml)	Comments
June 15	1	9.1	50	0.50	Fine detritus and algae. No apparent zooplankton.
June 15	2	8.5	55	0.45	Algae. No apparent zooplankton.
June 16	3	9.7	65	1.10	Mixture of algae and detritus. No apparent zooplankton.
June 16	4	9.1	50	0.95	Green algae. No apparent zooplankton.
June 17	5	19.8	50	2.40	Algae. No apparent zooplankton.
June 17	6	24.4	50	1.90	Mixture of zooplankton and algae.
June 18	7	9.1	65	10.90	Mixture of sediment and dense algae. No apparent zooplankton.
June 18	8	7.6	85	4.60	Mixture of bleached algae and sediment. No apparent zooplankton.
June 20	9	15.2	90	1.25	Mixture of zooplankton and algae.
June 20	10	13.7	90	2.80	Mixture of zooplankton and algae.
June 21	11	15.2	90	6.30	Algae with 0.4 ml af bluegreens at meniscus. No apparent zooplankton.
June 21	12	19.8	85	5.45	Bleached matted algae with bluegreens at meniscus. No apparent zooplankton.
June 30	13	8.5	100	1.60	Mixture of sediment and algae with bluegreens at meniscus. No apparent zooplankton.
June 30	14	9.1	95	0.65	Green algae. No apparent zooplankton.
July 1	15	9.1	85	1.45	Algae with 0.1 ml of bluegreens at meniscus.
	16		85		Not available.
July 2	17	9.1	95	1.55	Algae with 0.3 ml of bluegreens at meniscus. No apparent zooplankton.
July 2	18	13.7	100	1.40	Mixture of zooplankton and algae with 0.1 ml of bluegreens at meniscus.
July 3	19	9.1	95	2.90	Algae with 1.0 ml of bluegreens at meniscus. No apparent zooplankton.
July 3	20	9.1	90	1.50	Algae with 0.2 ml of bluegreens at meniscus. No apparent zooplankton.
July 13	21	9.1	105	0.80	Mixture of detritus and bluegreen algae.
July 13	22	9.1	95	0.55	Mixture of zooplankton and algae.
July 14	23	12.2	85	0.70	Mixture of zooplankton and green algae.
July 14	24	9.1	160	5.00	Mixture of zooplankton and matted algae with 0.7 ml of bluegreens at meniscus.
July 14	25	13.7	145	1.65	Mixture of zooplankton, detritus and algae.
July 15	26	11.6	160	4.95	Mixture of zooplankton and matted algae with 1.3 ml of bluegreens at meniscus.
July 15	27	12.2	85	0.80	Mixture of detritus and bluegreen algae. No apparent zooplankton.
Aug. 25	28	15.2	120	4.10	Approximately 2.6 ml is zooplankton with 1.5 ml of bluegreens at meniscus.
Aug. 25	29	16.8	110	1.70	Mixture of sediment and algae.

Set no. 16 - not available.

RAT LAKE 1988

Month/day	Set No.	Depth (m)	Transparency secchi (cm)	Settled volume (ml)	Comments
June 13	1	9.1	80	2.35	Mixture of matted yellow-green algae and zooplankton.
June 13	2	8.2	85	2.10	Matted yellow-green algae. No apparent zooplankton.
June 14	3	9.1	85	2.65	Matted green algae. No apparent zooplankton.
June 14	4	12.2	85	4.70	Mixture of matted green algae and zooplankton.
June 15	5	19.8	100	7.30	Mixture of matted green algae and zooplankton.
June 15	6	25.9	100	7.20	Mixture of matted yellow-green algae and zooplankton.
June 15	7	15.2	120	6.60	Matted yellow-green algae. No apparent zooplankton.
June 16	8	15.2	95	8.95	Matted green algae. No apparent zooplankton.
June 17	9	12.2	105	5.90	Mixture of matted green algae and zooplankton.
June 17	10	8.5	135	2.25	Approximately 2.0 ml is zooplankton with matted algae settled on top.
June 18	11	15.2	105	6.50	Mixture of matted yellow-green algae and zooplankton.
June 18	12	22.9	100	5.80	Mixture of matted green algae and zooplankton.
June 18	13	9.1	100	5.70	Matted green algae. No apparent zooplankton.
June 19	14	9.1	95	5.90	Mixture of matted yellow-green algae and zooplankton.
June 19	15	9.1	85	6.10	Matted yellow-green algae. No apparent zooplankton.
June 27	16	9.7	130	5.15	Mixture of matted green algae and zooplankton.
June 27	17	8.8	125	3.70	Mixture of matted white algae and zooplankton.
June 28	18	9.7	105	2.65	Mixture of white algae and zooplankton.
June 28	19	10.7	105	5.15	Mixture of matted white algae and zooplankton.
June 28	20	12.2	120	6.05	Mixture of zooplankton and matted green algae.
June 29	21	12.2	150	9.20	Matted green algae. No apparent zooplankton.
June 29	22	9.4	125	6.80	Mixture of zooplankton and matted green algae.
June 30	23	10.0	95	11.10	Mixture of matted green algae and zooplankton.
June 30	24	10.7	120	6.85	Matted green algae. No apparent zooplankton.
July 1	25	9.1	125	4.05	Mixture of zooplankton and matted green algae.
July 1	26	9.1	75	3.80	Mixture of matted green algae and zooplankton.
July 11	27	11.3	150	5.75	Mixture of matted green algae and zooplankton.
July 11	28	10.7	150	6.50	Mixture of matted yellow-green algae and zooplankton.

RAT LAKE 1989

Month/day	Set No.	Depth (m)	Transparency secchi (cm)	Settled volume (ml)	Comments
June 13	1	9.0	110	1.55	Mixture of zooplankton, sediment and matted green algae.
June 13	2	8.5	100	1.60	Mixture of zooplankton, sediment and matted green algae.
June 13	3	9.8	110	1.15	Mixture of zooplankton and matted green algae.
June 13	4	10.7	100	1.60	Mixture of zooplankton and matted green algae.
June 14	5	21.3	110	3.20	Mixture of zooplankton and matted green algae.
June 14	6	24.4	100	4.10	Mixture of zooplankton and matted green algae.
June 15	7	12.2	110	2.15	Mixture of zooplankton and matted green algae.
June 15	8	12.2	120	2.70	Mixture of zooplankton, sediment and green algae.
June 16	9	9.1	110	4.15	Mixture of zooplankton and green algae.
June 16	10	9.1	120	3.05	Mixture of zooplankton and green algae.
June 17	11	18.3	110	5.60	Mixture of zooplankton and dark green algae.
June 17	12	18.3	105	5.50	Mixture of zooplankton and dark green algae.
June 18	13	9.1	95	2.45	Mixture of zooplankton and green algae.
June 18	14	9.1	95	1.65	Mixture of zooplankton and green algae.
June 26	15	9.1	95	3.10	Mixture of zooplankton and matted green algae.
June 26	16	7.6	85	2.85	Mixture of zooplankton and matted green algae.
June 27	17	9.1	95	3.10	Mixture of zooplankton and matted green algae.
June 27	18	10.7	100	3.45	Mixture of zooplankton and matted green algae.
June 28	19	10.7	90	2.35	Mixture of zooplankton and matted green algae.
June 28	20	10.7	60	2.55	Mixture of zooplankton and matted green algae.
June 29	21	12.2	100	6.55	Mixture of zooplankton and matted green algae.
June 29	22	10.7	110	6.60	Mixture of zooplankton and matted green algae.
June 30	23	9.1	95	3.90	Mixture of zooplankton and matted green algae.
June 30	24	9.1	90	5.40	Mixture of zooplankton and matted green algae.

Appendix A2. Net plankton data for Threepoint Lake, 1987-89

THREEPOINT LAKE 1987

Month/day	Set No.	Depth (m)	Transparency secchi (cm)	Settled volume (ml)	Comments
July 17	1	5.5	65	0.65	Mixture of detritus and algae. No apparent zooplankton.
July 17	2	4.6	55	0.40	Mixture of algae and zooplankton.
July 18	3	6.1	60	0.30	Mixture of algae and zooplankton.
July 18	4	5.5	65	0.20	Algae. No apparent zooplankton.
July 18	5	5.5	75	0.30	Mixture of zooplankton and algae.
July 19	6	4.6	70	0.20	Mixture of zooplankton and algae.
July 19	7	4.6	75	0.45	Algae. No apparent zooplankton.
July 19	8	9.1	75	0.50	Detritus. No apparent zooplankton.
July 28	9	6.1	85	0.60	Mixture of sediment and algae.
July 28	10	4.6	80	0.40	Algae. No apparent zooplankton.
July 28	11	4.6	75	0.60	Mixture of zooplankton, algae and sediment.
July 29	12	5.2	85	0.40	Mixture of detritus and algae.
July 29	13	6.1	85	0.40	Mixture zooplankton and green algae.
July 29	14	6.1	85	0.40	Mixture of detritus and algae. No apparent zooplankton.
July 30	15	6.1	75	0.35	Mixture of detritus and algae. No apparent zooplankton.
July 30	16	6.1	85	0.45	Mixture of zooplankton and algae.
July 30	17	6.1	85	0.55	Mixture of zooplankton and algae.
July 31	18	6.1	95	0.55	Mixture of zooplankton and algae.
July 31	19	6.1	90	0.70	Mixture of zooplankton, algae and bluegreens.
Aug. 25	20	5.0	70	0.50	Green algae. No apparent zooplankton.
Aug. 25	21	5.0	70	1.50	Mixture of green and bluegreen algae. No apparent zooplankton.

THREEPOINT LAKE 1988

Month/day	Set No.	Depth (m)	Transparency secchi (cm)	Settled volume (ml)	Comments
July 13	1	4.0	65	4.00	Matted yellow-green algae mixed with some zooplankton.
July 13	2	4.6	45	1.30	Mixture of green algae and zooplankton.
July 14	3	4.6	50	1.85	Mixture of matted white algae and zooplankton.
July 14	4	4.6	60	2.08	Mixture of zooplankton and yellow algae.
July 15	5	4.6	60	1.60	Mixture of zooplankton and yellow algae.
July 15	6	8.0	50	1.65	Approximately 1.4 ml is zooplankton with fine white algae settled on top.
July 16	7	5.2	65	2.50	Mixture of greenish-yellow algae and zooplankton.
July 16	8	5.2	55	2.00	Mixture of matted white algae and zooplankton.
July 17	9	5.5	75	2.95	Mixture of matted green algae and zooplankton.
July 17	10	7.0	75	3.75	Mixture of matted bluegreen algae, sediment, and zooplankton.
July 25	11	6.0	65	1.25	Mixture of zooplankton and matted green algae.
July 25	12	4.5	70	1.90	Mixture of zooplankton and whitish algae.
July 26	13	4.0	75	0.75	Mixture of green algae and zooplankton.
July 26	14	7.0	75	1.30	Approximately 0.9 ml is zooplankton with fine green algae settled on top.
July 27	15	5.0	60	0.85	Mixture of sediment, algae and zooplankton.
July 27	16	5.0	65	0.80	Approximately 0.4 ml is zooplankton with green algae settled on top.
July 28	17	6.5	65	0.80	Approximately 0.5 ml is zooplankton with matted green algae settled on top.
July 28	18	6.0	75	0.80	Approximately 0.5 ml is zooplankton with bluegreen algae settled on top.
July 29	19	5.0	70	0.55	Mixture of zooplankton and green algae.
July 29	20	5.0	65	0.75	Approxmiately 0.3 ml is zooplankton with matted green algae settled on top.

THREEPOINT LAKE 1989

Month/day	Set No.	Depth (m)	Transparency secchi (cm)	Settled volume (ml)	Comments
Aug. 8	13	6.0	70	1.35	Approximately 1.0 ml is zooplankton with green algae settled on top.
Aug. 8	14	6.0	70	1.30	Approximately 1.2 ml is zooplankton with light algae settled on top.
Aug. 9	15	6.0	70	0.55	Mixture of zooplankton and green algae.
Aug. 9	16	6.0	70	0.65	Mixture of zooplankton, sediment and green algae.
Aug. 10	17	6.0	60	0.65	Mixture of zooplankton, sediment and green algae.
Aug. 10	18	6.0	55	0.85	Mixture of zooplankton and sediment.
Aug. 11	19	6.0	80	0.95	Approximately 0.7 ml is zooplankton with fine green algae settled on top.
Aug. 11	20	6.0	50	1.10	Approximately 0.7 ml is zooplankton with fine green algae settled on top.

Set numbers 1-12 - not available.

Appendix A3. Net plankton data for Cross Lake, 1987-89

WEST CROSS LAKE 1987

Month/day	Set No.	Depth (m)	Transparency secchi (cm)	Settled volume (ml)	Comments
July 29	1	1.5		4.90	Approximately 3.9 ml is zooplankton with algae settled on top.
July 29	2	2.0		4.20	Approximately 3.5 ml is zooplankton with algae settled on top.
July 30	3	2.0		8.10	Mixture of algae, sediment and zooplankton.
July 30	4	2.0		6.10	Mixture of zooplankton and algae.
July 31	5	2.0		6.00	Mixture of zooplankton and bluegreen algae.
Aug. 1	6	2.0		0.90	Mixture of sediment and algae. No apparent zooplankton.
Aug. 12	7	1.5		1.00	Sediment and green algae. No apparent zooplankton.
Aug. 12	8	3.0		2.50	Mixture of green algae and sediment. No apparent zooplankton.
Aug. 13	9	1.5		1.60	Green algae. No apparent zooplankton.
Aug. 13	10	3.0		0.95	Mixture of sediment and algae. No apparent zooplankton.
Aug. 14	11	6.0		5.30	Mixture of zooplankton and green algae with 0.3 ml of bluegreens at meniscus.
Aug. 14	12	8.0		4.80	Bleached matted algae. No apparent zooplankton.
Aug. 15	13	5.0		3.05	Green algae with 0.4 ml of bluegreens at meniscus. No apparent zooplankton.
Aug. 15	14	6.0		2.40	Green algae. No apparent zooplankton.
Aug. 16	15	1.5		0.45	Majority zooplankton.
Aug. 16	16	3.0		2.40	Sediment. No apparent zooplankton.
Aug. 17	17	2.0		2.30	Mixture of zooplankton and algae with 0.2 ml of bluegreens at meniscus.

Secchi transparencies - all sets - not available.

WEST CROSS LAKE 1988

Month/day	Set No.	Depth (m)	Transparency secchi (cm)	Settled volume (ml)	Comments
Aug. 12	1	1.2	25	3.95	Mixture of zooplankton, sediment and algae with 0.5 ml of bluegreens at meniscus.
Aug. 12	2	1.2	25	4.95	Mixture of zooplankton, sediment and algae with 0.7 ml of bluegreens at meniscus.
Aug. 13	3	1.2	20	7.31	Approximately 5.0 ml is zooplankton with detritus and algae on top.
Aug. 11	4	5.0	95	8.05	Matted green algae. No apparent zooplankton.
Aug. 11	5	7.0	85	24.60	Mixture of pillowy algae and zooplankton.
Aug. 12	6	4.5	95	13.85	Mixture of matted green algae and zooplankton.
Aug. 12	7	6.0	70	8.90	Mixture of matted green algae and zooplankton.
Aug. 12	8	5.0	70	15.15	Matted green algae. No apparent zooplankton.
Aug. 12	9	6.0	80	8.85	Mixture of matted green algae and zooplankton.
Aug. 13	10	5.0	95	12.05	Mixture of matted green algae and zooplankton.
Aug. 13	11	4.5	85	15.75	Mixture of matted green algae and zooplankton.
Aug. 22	12	4.0	85	0.65	Mixture of sediment and zooplankton.
Aug. 22	13	4.0	85	0.55	Fine sediment and zooplankton.
Aug. 23	14	1.2	55	0.35	Fine sediment and zooplankton.
Aug. 23	15	1.2	65	0.35	Fine sediment and zooplankton.
Aug. 24	16	1.2	75	0.25	Fine sediment and zooplankton.
Aug. 24	17	1.2	70	0.50	Mixture of sediment and zooplankton.

WEST CROSS LAKE 1989

Month/day	Set No.	Depth (m)	Transparency secchi (cm)	Settled volume (ml)	Comments
Aug. 9	1	5.0	75	0.40	Sediment and green algae. No apparent zooplankton.
Aug. 9	2	9.0	80	0.55	Mixture of zooplankton, sediment and green algae.
Aug. 10	3	6.0	165	8.20	Mixture of zooplankton and bluegreen algae.
Aug. 10	4	7.0	180	4.00	Mixture of zooplankton and bluegreen algae with 0.6 ml of bluegreens at meniscus.
Aug. 11	5	7.5	185	8.70	Mixture of zooplankton and bluegreen algae with 0.5 ml of bluegreens at meniscus.
Aug. 11	6	8.5	180	5.45	Mixture of zooplankton and bluegreen algae with 1.3 ml of bluegreens at meniscus.
Aug. 11	7	6.0	170	8.50	Mixture of zooplankton and bluegreen algae.
Aug. 22	8	1.5	70	0.30	Mixture of sediment, detritus and zooplankton.
Aug. 22	9	1.3	75	0.35	Mixture of zooplankton and green algae.
Aug. 23	10	2.0	95	0.25	Mixture of zooplankton, detritus and sediment.
Aug. 23	11	2.0	90	0.45	Mixture of zooplankton, detritus and sediment.
Aug. 24	12	2.0	75	0.40	Mixture of sediment, algae and zooplankton.
Aug. 21	13	3.3	90	1.25	Mixture of zooplankton and matted green algae.
Aug. 22	14	3.0		2.45	Mixture of zooplankton, sediment and algae.
Aug. 23	15	2.1	55	2.90	Mixture of zooplankton, sediment and algae.
Aug. 23	16	4.0	75	3.35	Mixture of zooplankton, algae, sediment and detritus.

Aug. 22, set no. 14 - secchi transparency not available.

EAST CROSS LAKE - 1987

Month/day	Set No.	Depth (m)	Transparency secchi (cm)	Settled volume (ml)	Comments
Aug. 12	1	1.2	35	11.80	Mixture of detritus and algae. No apparent zooplankton.
Aug. 12	2	1.2	35	10.10	Detritus. No apparent zooplankton.
Aug. 13	3	1.2	35	9.30	Approximately 6.0 ml is zooplankton with algae settled on top.
Aug. 13	4	1.2	25	9.00	Approximately 7.0 ml is zooplankton with detritus and algae settled on top.
Aug. 14	5	1.5	25	5.95	Approximately 1.2 ml is zooplankton with detritus and algae settled on top.
Aug. 14	6	1.8	25	5.75	Mixture of zooplankton and green algae.
Aug. 15	7	1.8	55	3.20	Approximately 1.5 ml is zooplankton with algae and detritus settled on top.
Aug. 15	8	1.8	50	6.80	Majority zooplankton.
Aug. 16	9	1.2	40	4.20	Approximately 1.1 ml is zooplankton with detritus and algae settled on top.
Aug. 16	10	1.2	70	3.15	Detritus. No apparent zooplankton.
Aug. 26	11	1.2	60	3.85	Mixture of detritus, algae and zooplankton.
Aug. 26	12	1.5	60	4.60	Dense detritus and algae with some zooplankton.
Aug. 27	13	1.8	35	2.35	Mixture of zooplankton and algae.
Aug. 27	14	1.8	45	3.00	Approximately 1.5 ml is zooplankton with algae settling on top.

EAST CROSS LAKE 1988

Month/day	Set No.	Depth (m)	Transparency secchi (cm)	Settled volume (ml)	Comments
Aug. 9	1	0.9	20	3.30	Mixture of zooplankton, sediment and algae.
Aug. 9	2	0.9	30	2.80	Mixture of zooplankton, sediment and algae.
Aug. 10	3	0.9	30	2.30	Detritus and algae. No apparent zooplanton.
Aug. 10	4	1.2	30	3.95	Mixture of algae and zooplankton.

Appendix A4. Net plankton data for Sipiwesk Lake, 1987-89

SIPIWESK LAKE 1987

Month/day	Set No.	Depth (m)	Transparency secchi (cm)	Settled volume (ml)	Comments
June 16	1	4.5		3.60	Majority fine sediment. No apparent zooplankton.
June 16	2	5.0		1.10	Mixture of zooplankton and detritus.
June 16	3	4.0		1.10	Mixture of zooplankton and fine sediment.
June 17	4	5.5		0.95	Bleached detritus and algae. No apparent zooplankton.
June 17	5	4.5		0.55	Bleached algae and a leaf. No apparent zooplankton.
June 18	6	5.0		0.75	Mixture of zooplankton and bleached zooplankton.
	7				Not available.
June 19	8	5.5		0.65	Mixture of zooplankton and bleached algae.
	9				Not available.
June 19	10			0.55	Bleached algae. No apparent zooplankton.
June 20	11	8.0		0.80	Mixture of detritus and algae. No apparent zooplankton.
June 20	12	7.0		0.40	Mixture of green algae and zooplankton.
June 20	13	7.0		2.10	Majority zooplankton.
June 21	14	5.0		2.30	Mixture of zooplankton and bleached algae.
June 21	15	5.0		0.75	Majority zooplankton.
June 21	16	4.5		0.95	Majority zooplankton.
June 21	17	5.0		2.90	Mixture of zooplankton, algae and detritus with 0.3 ml of bluegreens at meniscus.
June 23	18	6.0		1.45	Mixture of zooplankton and algae. Some bluegreens at top of tube.
June 23	19	7.0		1.75	Mixture of zooplankton and bleached algae.
June 23	20	6.0		2.45	Majority zooplankton.
June 30	21	8.0		1.15	Bleached detritus and algae. No apparent zooplankton.
June 30	22	18.0		5.90	Mixture of algae and zooplankton.
June 30	23	12.0		3.05	Approximately 2.0 ml is zooplankton, the remainder is algae.
June 30	24	6.5		1.10	Mixture of zooplankton and bleached algae.
July 1	25	8.0		2.25	Approximately 1.9 ml is zooplankton with detritus and algae settled on top.
July 1	26	7.5		1.95	Majority zooplankton.
July 1	27	7.0		1.20	Mixture of zooplankton and algae.
July 1	28	7.0		1.70	Mixture of zooplankton, algae and sediment with 0.4 ml of of bluegreens at meniscus.
July 2	29	5.0		4.15	Dense algae. No apparent zooplankton.
July 2	30	7.0		3.00	Approximately 2.5 ml is zooplankton, 0.3 ml is algae settled on top and 0.2 ml is bluegreens at meniscus.
July 2	31	8.0		7.15	Dense algae. No apparent zooplankton.
July 2	32	6.5		1.25	Approximately 0.7 ml is zooplankton with algae settled on top.
July 3	33	13.0		27.40	Majority algae with some zooplankton dispersed throughout.
July 3	34	4.0		5.10	Majority detritus with slight algae settled on top. No apparent zooplankton.
July 3	35	8.0		2.75	Mixture of bleached zooplankton and algae.
July 3	36	5.0		2.65	Majority zooplankton.
July 4	37			1.50	Approximately 0.9 ml is zooplankton, with fine sediment and algae settled on top and 0.2 ml of bluegreens at meniscus.
July 4	38			3.05	Approximately 1.8 ml is zooplankton, 0.9 ml is algae and 0.3 ml is bluegreens at the meniscus.
July 4	39			1.60	Mixture of zooplankton and algae with 0.2 ml of bluegreens at the meniscus.
July 4	40			1.45	Bleached matted algae with 0.1 ml being bluegreens at the meniscus.

Set numbers 10, 37, 38, 39 and 40 - no depths available.
Set numbers 7 and 9 - data not available.
Secchi transparencies - all sets - not available.

SIPIWESK LAKE 1988

Month/day	Set No.	Depth (m)	Transparency secchi (cm)	Settled volume (ml)	Comments
June 14	1	6.0		1.45	Matted algae. No apparent zooplankton.
June 14	2	5.5		2.25	Mixture of zooplankton and algae.
June 15	3	4.5		0.65	Mixture of greyish-white algae and zooplankton.
June 15	4	4.5		0.75	Mixture of matted white algae and zooplankton.
June 16	5	4.5		1.15	Mixture of zooplankton and algae.
June 16	6	5.0		1.45	Approximately 0.7 ml is zooplankton topped with green algae.
June 16	7	5.0		0.65	Approximately 0.5 ml is zooplankton.
June 17	8	12.0		1.95	Approximately 1.6 ml is zooplankton.
June 20	9	6.0		1.75	White matted algae. No apparent zooplankton.
June 20	10	6.0		1.05	Approximately 0.3 ml is zooplankton. Remainder is white algae.
June 27	11	5.0		2.25	Approximately 2.1 ml is zooplankton.
June 28	12	5.5		1.55	Approximately 1.4 ml is zooplankton.
June 29	13	6.5		2.65	Approximately 2.5 ml is zooplankton with fine algae settled on top.
June 29	14	6.5		3.50	Fine sediment and detritus. No apparent zooplankton.
June 30	15	9.5		1.05	Mixture of algae, sediment and zooplankton.
June 30	16	6.5		1.35	Approximately 1.2 ml is zooplankton with algae settled on top.
July 1	17	9.0		1.45	Approximately 1.0 ml is zooplankton with fine green algae settled on top.
July 1	18	4.5		0.75	Approximately 0.4 ml is zooplankton with green algae settled on top.
July 2	19	6.0		1.30	Approximately 0.9 ml is zooplankton with green algae settled on top.
July 2	20	6.5		1.05	Approximately 0.9 ml is zooplankton.
July 2	21	8.0		1.25	Approximately 1.1 ml is zooplankton.
July 3	22	4.0		0.45	Mixture of zooplankton and algae.
July 3	23	9.0		1.70	Approximately 1.4 ml is zooplankton with algae settled on top.
July 12	24	7.0		2.70	Approximately 1.5 ml is zooplankton.
July 12	25	9.5		1.70	Majority zooplankton.
July 12	26	4.0		1.95	Majority zooplankton.
July 12	27	9.0		1.85	Majority zooplankton with algae settled on top.
July 13	28	7.0		1.05	Approximately 0.8 ml is zooplankton with fine algae settled on top.
July 13	29	6.5		1.10	Majority zooplankton.
July 13	30	6.0		2.05	Approximately 1.8 ml is zooplankton with fine green algae settled on top.
July 13	31	9.5		2.35	Approximately 2.1 ml is zooplankton with fine green algae settled on top.
July 14	32	10.5		1.35	Mixture of detritus and algae.
July 14	33	6.0		1.80	Approximately 1.6 ml is zooplankton with bluegreen algae on top.
July 14	34	7.5		2.15	Approximately 1.9 ml is zooplankton with fine green algae settled on top.
July 14	35	3.5		0.55	Mixture of zooplankton and algae.
July 15	36	8.0		2.50	Approximately 2.0 ml is zooplankton with fine green algae settled on top.
July 15	37	10.0		5.05	Approximately 4.6 ml is zooplankton with pillowy green algae settled on top.
July 15	38	7.5		7.05	Approximately 6.5 ml is zooplankton with pillowy green algae on top.
July 15	39	9.0		2.65	Approximately 2.2 ml is zooplankton with pillowy green algae on top.
July 17	40	4.5		1.35	Approximately 1.1 ml is zooplankton and fine sediment topped with bluegreen algae.
July 17	41	13.5		7.50	Approximately 6.9 ml is zooplankton with fine bluegreen algae settled on top.
July 17	42	8.5		3.60	Approximately 2.9 ml is zooplankton, rest is algae.
July 17	43	18.0		4.25	Approximately 3.6 ml is zooplankton with bluegreen algae settled on top.

Secchi transparencies - all sets - not available.

SIPIWESK LAKE 1989

Month/day	Set No.	Depth (m)	Transparency secchi (cm)	Settled volume (ml)	Comments
June 12	1	4.5	40	1.30	Mixture of zooplankton, sediment and algae.
June 12	2	5.0	80	1.50	Mixture of zooplankton, sediment and algae.
June 13	3	5.0	60	0.71	Mixture of zooplankton and algae.
June 13	4	3.5	70	0.90	Mixture of zooplankton and sediment.
June 13	5	5.0	50	0.50	Mixture of zooplankton and sediment.
June 13	6	5.0	70	0.50	Mixture of zooplankton and pillowy light green algae.
June 14	7	5.0	30	0.75	Mixture of zooplankton and white algae.
June 14	8	3.0	30	0.55	Mixture of zooplankton and sediment.
June 14	9	3.5	50	0.70	Mixture of zooplankton, sediment and algae.
June 14	10	2.5	60	0.45	Mixture of zooplankton, sediment and algae.
June 15	11	6.0	60	1.40	Approximately 1.0 ml is zooplankton with algae settled on top.
June 15	12	6.0	50	0.80	Approximately 0.5 ml is zooplankton with light algae settled on top.
June 15	13	4.0	60	1.30	Approximately 1.0 ml is zooplankton with light green algae on top.
June 15	14	4.0	40	0.90	Mixture of zooplankton and matted unknowns.
June 16	15	6.5	50	1.10	Approximately 0.6 ml is zooplankton with green algae settled on top.
June 16	16	5.0	30	1.20	Approximately 0.8 ml is zooplankton with white algae settled on top.
June 16	17	5.0	45	1.60	Approximately 1.3 ml is zooplankton with white algae settled on top.
June 16	18	6.0	65	0.90	Approximately 0.7 ml is zooplankton with white algae settled on top.
June 17	19	6.0	80	1.15	Mixture of zooplankton, sediment and green algae.
June 17	20	8.0	65	1.09	Mixture of zooplankton, sediment and bluegreen algae.
June 27	21	8.0	40	1.30	Approximately 1.0 ml is zooplankton with algae settled on top.
June 27	22	6.0	50	1.55	Approximately 0.7 ml is zooplankton with algae settled on top.
June 27	23	3.5	35	0.95	Mixture of zooplankton, sediment and bluegreen algae.
June 27	24	5.0	30	0.75	Approximately 0.5 is zooplankton with sediment settled on top.
June 28	25	5.0	80	2.25	Mixture of zooplankton, sediment and bluegreen algae.
June 28	26	5.0	110	4.20	Approximately 2.1 ml is zooplankton with algae settled on top.
June 28	27	6.0	160	4.65	Approximately 2.1 ml is zooplankton with algae settled on top and 0.15 ml of bluegreens at meniscus
June 28	28	7.0	130	4.35	Mixture of zooplankton and bluegreen algae with 0.3 ml of bluegreens at meniscus.
June 29	29	6.0	230	2.75	Approximately 1.2 ml is zooplankton. Remainder is zooplankton, sediment and bluegreens.
June 29	30	8.0	260	2.80	Mixture of zooplankton and matted bluegreen algae.
June 29	31	7.5	260	7.60	Mixture of zooplankton and matted bluegreen algae.
June 29	32	3.5	170	3.15	Approximately 2.3 ml is zooplankton and 0.85 ml is bluegreens and sediment.
June 30	33	4.5	95	0.65	Mixture of zooplankton and sediment.
June 30	34	6.0	95	2.65	Mixture of zooplankton and blueish-green algae.
June 30	35	5.0	80	2.20	Mixture of zooplankton and light green algae.
June 30	36	12.0	75	2.45	Mixture of zooplankton, sediment and algae.
July 1	37	6.0	85	1.35	Mixture of zooplankton, bluegreen algae and sediment.
July 1	38	15.0	75	2.10	Approximately 1.0 ml is zooplankton with green algae settled on top.
July 1	39	5.0	65	2.95	Mixture of zooplankton and green algae.
July 1	40	6.0	65	1.55	Mixture of zooplankton and green algae.

Appendix A5. Net plankton data for Split Lake, 1987-89

SPLIT LAKE 1987

Month/day	Set No.	Depth (m)	Transparency secchi (cm)	Settled volume (ml)	Comments
July 16	1	2.0	35	0.30	Detritus. No apparent zooplankton.
July 16	2	3.0	35	0.30	Detritus. No apparent zooplankton.
July 16	3	5.0	40	0.20	Detritus. No apparent zooplankton.
July 16	4	2.0	35	0.45	Detritus. No apparent zooplankton.
July 17	5	1.0	45	0.35	Detritus and algae. No apparent zooplankton.
July 17	6	2.0	35	1.00	Green algae. No apparent zooplankton.
July 17	7	3.0	35	1.10	Green algae and detritus. No apparent zooplankton.
July 17	8	9.0	35	0.80	Green algae. No apparent zooplankton.
July 18	9	5.0	35	0.40	Detritus. No apparent zooplankton.
July 18	10	3.0	65	0.35	Detritus. No apparent zooplankton.
July 18	11	10.0	35	0.80	Detritus and green algae. No apparent zooplankton.
July 18	12	10.0	35	0.90	Detritus and green algae. No apparent zooplankton.
July 19	13	9.0	35	0.80	Detritus. No apparent zooplankton.
July 19	14	12.0	75	0.70	Detritus with some zooplankton.
July 19	15	7.0	45	0.40	Detritus. No apparent zooplankton.
July 19	16	9.0	40	0.40	Detritus. No apparent zooplankton.
July 20	17	3.0	80	0.50	Detritus and green algae. No apparent zooplankton.
July 20	18	3.0	85	0.30	Detritus with some zooplankton.
July 20	19	4.0	95	1.00	Mixture of zooplankton and algae.
July 20	20	12.0	90	0.50	Mixture of zooplankton, detritus and bluegreens.
July 28	21	2.0	45	0.10	Detritus. No apparent zooplankton.
July 28	22	6.0	90	0.90	Mixture of zooplankton and green and bluegreen algae.
July 29	23	11.0	85	2.60	Mixture of zooplankton, green and bluegreen algae.
July 29	24	13.0	95	2.00	Mixture of zooplankton, green and bluegreen algae.
July 29	25	4.0	50	0.60	Green algae and detritus. No apparent zooplankton.
July 30	26	11.0	85	3.20	Mixture of zooplankton, algae and detritus.
July 30	27	2.0	45	0.45	Algae. No apparent zooplankton.
July 30	28	8.0	105	2.90	Mixture of zooplankton and green and bluegreen algae.
July 31	29	17.0	55	1.50	Mixture of zooplankton and green algae.
July 31	30	6.0	65	1.40	Detritus and sediment. No apparent zooplankton.
July 31	31	2.0	50	0.30	Algae. No apparent zooplankton.

SPLIT LAKE 1988

Month/day	Set No.	Depth (m)	Transparency secchi (cm)	Settled volume (ml)	Comments
July 12	1	5.0	35	0.70	Green matted algae. No apparent zooplankton.
July 12	2	3.0	45	0.35	Matted algae. No apparent zooplankton.
July 12	3	1.0	45	0.35	Mixture of matted green algae and zooplankton.
July 13	4	10.0	55	0.40	Mixture of zooplankton and white algae.
July 13	5	3.0	55	0.55	Approximately 0.45 ml is zooplankton.
July 14	6	4.0	55	0.70	Mixture of zooplankton and white algae.
July 14	7	3.0	45	1.00	Majority zooplankton
July 15	8	10.0	35	0.90	Mixture of green algae and zooplankton.
July 15	9	10.0	35	1.00	Green matted algae with invertabrates settled at bottom and top of tube. No apparent zooplankton.
July 16	10	2.0	35	0.45	Green algae and detritus. No apparent zooplankton.
July 16	11	1.0	35	0.40	Dense matted algae. No apparent zooplankton.
July 17	12	4.0	55	0.50	Mixture of zooplankton, fine sediment and algae.
July 17	13	9.0	55	0.70	Detritus and green algae. No apparent zooplankton.
July 26	14	2.0	45	0.15	Fine sediment. No apparent zooplankton.
July 26	15	6.0	40	0.40	Mixture of zooplankton, detritus and algae.
July 26	16	2.0	65	0.30	Fine sediment. No apparent zooplankton.
July 27	17	4.0	50	0.15	Fine sediment. No apparent zooplankton.
July 27	18	2.0	50	0.05	Fine sediment. No apparent zooplankton.
July 27	19	2.0	45	0.05	Fine sediment. No apparent zooplankton.
July 28	20	4.0	45	0.25	Fine sediment. No apparent zooplankton.
July 28	21	2.0	45	0.40	Fine sediment. No apparent zooplankton.
July 28	22	4.0	80	0.80	Mixture of detritus and zooplankton.

SPLIT LAKE 1989

Month/day	Set No.	Depth (m)	Transparency secchi (cm)	Settled volume (ml)	Comments
Aug. 9	1	2.0	35	0.30	Mixture of zooplankton and white algae.
Aug. 9	2	4.0	35	0.25	Mixture of zooplankton and white algae.
Aug. 9	3	2.0	35	0.15	Mixture of zooplankton and white algae.
Aug.10	4	3.0	135	1.30	Approximately 1.0 ml is zooplankton with light algae settled on top.
Aug.10	5	4.0	145	1.15	Approximately 0.9 ml is zooplankton with light algae settled on top.
Aug. 11	6	3.0	135	0.75	Approximately 0.5 ml is zooplankton with light algae settled on top.
Aug. 11	7	2.0	125	0.40	Mixture of zooplankton and white detritus.
Aug. 12	8	10.0	75	0.25	Mixture of sediment, algae and zooplankton.
Aug. 12	9	10.0	75	0.25	Mixture of sediment, algae and zooplankton.
Aug. 22	10	3.0	35	0.10	Fine sediment with sparse zooplankton.
Aug. 22	11	4.0	35	0.10	Fine sediment with sparse zooplankton.
Aug. 23	12	2.0	95	0.35	Mixture of zooplankton and green algae.
Aug. 23	13	7.0	85	0.45	Mixture of sediment, algae and zooplankton.
Aug. 23	14	5.0	65	0.55	Mixture of sediment, algae and zooplankton.
Aug. 24	15	15.0	65	0.55	Mixture of zooplankton and green algae.
Aug. 24	16	3.0	65	0.65	Mixture of zooplankton and green algae.
Aug. 24	17	2.0	65	0.35	Mixture of zooplankton and green algae.
Aug. 25	18	6.0	65	0.40	Mixture of zooplankton, detritus and algae.

Appendix A6. Net plankton data for Stephens Lake, 1987-89

STEPHENS LAKE 1987

Month/day	Set No.	Depth (m)	Transparency secchi (cm)	Settled volume (ml)	Comments
June 17	1	16.0	45	0.95	Bleached algae and detritus. No apparent zooplankton.
June 17	2	12.0	45	1.25	Bleached algae. No apparent zooplankton.
June 17	3	12.0	45	0.85	Mixture of detritus, algae and zooplankton.
June 17	4	13.0	45	0.45	Bleached algae. No apparent zooplankton.
June 18	5	10.0	35	0.55	Mixture of detritus and algae. No apparent zooplankton.
June 18	6	17.0	45	0.50	Mixture of detritus and algae. No apparent zooplankton.
June 19	7	12.0	45	1.30	Mixture of detritus and algae. No apparent zooplankton.
June 19	8	11.0	45	0.75	Green algae. No apparent zooplankton.
June 20	9	12.0	50	0.85	Mixture of detritus and algae. No apparent zooplankton.
June 22	10	11.0	55	0.70	Fine green algae. No apparent zooplankton.
June 22	11	15.0	45	0.95	Fine green algae. No apparent zooplankton.
June 22	12	18.0	50	1.35	Fine green algae. No apparent zooplankton.
July 1	13	7.0	55	1.20	Majority zooplankton.
July 1	14	8.0	115	0.50	Majority zooplankton.
July 1	15	8.0	115	0.40	Mixture of detritus and sediment. No apparent zooplankton.
July 1	16	9.0	120	1.60	Majority zooplankton.
July 1	17	10.0	135	0.90	Majority zooplankton.
July 1	18	8.0	90	0.50	Mixture of algae and zooplankton.
July 2	19	7.0	70	0.70	Bleached algae. No apparent zooplankton.
July 2	20	8.0	70	0.85	Mixture of zooplankton and bleached algae.
July 2	21	10.0	70	0.90	Dense green algae. No apparent zooplankton.
July 3	22	12.0	70	0.45	Algae. No apparent zooplankton.
July 3	23	13.0	50	1.30	Dense matted green algae. No apparent zooplankton.
July 3	24	19.0	55	2.10	Mixture of green algae and zooplankton.
July 4	25	17.0	50	2.20	Fine green algae. No apparent zooplankton.
July 4	26	24.0	55	3.40	Fine green algae. No apparent zooplankton.
July 4	27	22.0	55	2.95	Fine green algae. No apparent zooplankton.
July 5	28	10.0	45	0.45	Fine green algae. No apparent zooplankton.
July 5	29	20.0	65	3.20	Fine green algae. No apparent zooplankton.
July 5	30	24.0	65	2.40	Fine green algae. No apparent zooplankton.
July 6	31	22.0	45	2.70	Fine green algae. No apparent zooplankton.
July 6	32	22.0	55	2.50	Fine green algae. No apparent zooplankton.
July 6	33	15.0	45	0.50	Mixture of detritus and fine green algae.
July 14	34	20.0	50	1.35	Mixture of zooplankton, detritus, and algae.
July 14	35	16.0	55	1.10	Bleached algae. No apparent zooplankton.
July 14	36	16.0	50	1.10	Bleached algae. No apparent zooplankton.
July 15	37	21.0	45	0.90	Green algae. No apparent zooplankton.

STEPHENS LAKE 1988

Month/day	Set No.	Depth (m)	Transparency secchi (cm)	Settled volume (ml)	Comments
June 14	1	10.0	45	1.20	Fine algae and sediment. No apparent zooplankton.
June 14	2	12.0	55	0.85	Matted algae and sediment. No apparent zooplankton.
June 15	3	10.0	55	0.70	Fine algae and sediment. No apparent zooplankton.
June 15	4	11.0	55	1.30	Matted algae and sediment. No apparent zooplankton.
June 16	5	12.0	70	0.75	Mixture of zooplankton and sediment.
June 16	6	8.0	65	0.85	Fine algae and sediment. No apparent zooplankton.
June 16	7	16.0	75	1.75	Fine detritus and green algae. No apparent zooplankton.
June 17	8	7.0	95	0.85	Approximately 0.7 ml is zooplankton.
June 17	9	6.0	95	0.85	Sediment. No apparent zooplankton.
June 18	10	7.0	115	0.55	Approximately 0.2 ml is zooplankton, with white algae settled on top.
June 18	11	8.0	115	1.60	Approximately 1.2 ml is zooplankton. Remainder is algae.
June 19	12	8.0	35	0.95	Approximately 0.7 ml is zooplankton with algae settled on top.
June 19	13	9.0	75	0.90	Approximately 0.7 ml is zooplankton.
June 19	14	9.0	65	0.85	Approximately 0.5 ml is zooplankton with white algae settled on top.
June 20	15	22.0	75	3.05	Matted green algae. No apparent zooplankton.
June 20	16	18.0	75	3.00	Matted green algae. No apparent zooplankton.
June 20	17	16.0	75	2.05	Matted green algae. No apparent zooplankton.
June 21	18	17.0	75	3.00	Mixture of matted green algae and zooplankton.
June 21	19	16.0	75	2.20	Matted green algae. No apparent zooplankton.
June 28	20	12.0	65	1.35	Matted white algae. No apparent zooplankton.
June 28	21	16.0	65	1.35	Matted white algae. No apparent zooplankton.
June 28	22	18.0	55	1.45	Matted white algae. No apparent zooplankton.
June 29	23	15.0	55	1.40	Matted white algae. No apparent zooplankton.
June 29	24	20.0	55	1.65	Matted white algae. No apparent zooplankton.
June 29	25	14.0	55	1.75	Matted green algae. No apparent zooplankton.
June 30	26	29.0	75	5.90	Matted green algae. No apparent zooplankton.
June 30	27	17.0	65	2.45	Matted white algae. No apparent zooplankton.
June 30	28	18.0	65	2.50	Matted white algae. No apparent zooplankton.
July 1	29	4.0	55	0.60	Algae and fine sediment. No apparent zooplankton.
July 1	30	12.0	35	1.25	Matted white algae. No apparent zooplankton.
July 1	31	14.0	45	1.20	Matted white algae. No apparent zooplankton.
July 2	32	12.0	45	0.60	Algae and sediment. No apparent zooplankton.
July 2	33	17.0	45	0.55	Algae. No apparent zooplankton.
July 2	34	17.0	55	1.15	Matted green algae. No apparent zooplankton.

STEPHENS LAKE 1989

Month/day	Set No.	Depth (m)	Transparency secchi (cm)	Settled volume (ml)	Comments
June 13	1	12.0	55	1.50	Mixture of zooplankton, fine sediment and matted green algae.
June 14	2	5.0	55	0.80	Mixture of zooplankton, detritus and matted algae.
June 14	3	12.0	55	0.95	Mixture of zooplankton and matted algae.
June 15	4	14.0	55	1.85	Mixture of zooplankton, fine sediment and matted green algae.
June 15	5	15.0	65	1.05	Mixture of zooplankton and matted green algae.
June 16	6	20.0	65	0.80	Mixture of zooplankton and matted green algae.
June 16	7	14.0	65	1.10	Mixture of zooplankton and matted green algae.
June 17	8	10.0	145	2.45	Mixture of zooplankton, course sediment, and matted algae.
June 17	9	8.0	125	1.50	Mixture of zooplankton and matted algae.
June 18	10	9.0	125	1.50	Mixture of zooplankton and matted algae.
June 18	11	9.0	85	1.85	Mixture of zooplankton and matted algae.
June 19	12	7.0	125	1.15	Mixture of zooplankton and matted algae.
June 19	13	7.0	155	0.90	Mixture of zooplankton and matted algae.
June 27	14	14.0	55	0.50	Mixture of zooplankton, course sediment and algae.
June 27	15	18.0	55	0.50	Mixture of zooplankton, course sediment and algae.
June 28	16	8.0	105	1.30	Mixture of zooplankton and course and fine sediment.
June 28	17	8.0	75	1.15	Approximately 0.8 ml is zooplankton, the remainder is algae.
June 28	18	9.0	125	0.90	Mixture of zooplankton and fine white algae.
June 29	19	12.0	85	1.80	Mixture of zooplankton and light green algae.
June 29	20	25.0	75	4.15	Mixture of zooplankton and dense matted green algae.
June 29	21	8.0	85	1.30	Mixture of zooplankton and matted light green algae.
June 29	22	10.0	65	1.00	Mixture of zooplankton and dense matted green algae.
June 30	23	20.0	55	1.55	Mixture of zooplankton and dense matted green algae.
June 30	24	20.0	55	2.10	Mixture of zooplankton and dense matted white algae.
June 30	25	20.0	55	1.75	Mixture of zooplankton and dense matted white algae.
June 30	26	27.0	55	1.80	Mixture of zooplankton and matted white algae.
July 1	27	14.0	55	0.50	Mixture of zooplankton, sediment, and algae.
July 1	28	17.0	55	0.60	Mixture of zooplankton and fine white algae.
July 1	29	12.0	55	0.60	Mixture of zooplankton and matted green algae.
July 11	30	19.0	55	0.35	Mixture of algae and zooplankton.
July 11	31	21.0	55	0.90	Mixture of algae and zooplankton.
July 11	32	18.0	55	0.80	Mixture of zooplanton and fine white algae.
July 12	33	14.0	55	0.55	Mixture of matted green algae and zooplankton.
July 12	34	10.0	55	0.60	Mixture of zooplankton and matted green algae.
July 12	35	19.0	55	0.60	Mixture of zooplankton and matted green algae.
July 13	36	19.0	55	0.50	Mixture of zooplankton and green algae.
July 13	37	19.0	55	0.75	Mixture of zooplankton and green algae.

Appendix B1. List of Manitoba Department of Natural Resources Fisheries Branch reports written to date on data collected from the Churchill River Diversion, and Nelson River under the Northern Flood Agreement Claim numbers 12 and 18.

Appendix B1. List of Manitoba Department of Natural Resources Fisheries Branch reports written to date on data collected from the Churchill River Diversion and Nelson River under the Northern Flood Agreement Claim numbers 12 and 18. Documents are listed in chronological order of publication.

Year	Title
1984	Patalas, J.W. 1984. Fish population data from Sipiwesk, Split and Stephens lakes, 1983. Man. Dept. Nat. Res. Fish. Br. MS Report No. 84-24, 66pp.
	_____1984. Fish population data from Notigi, Wapisu, Threepoint and Footprint lakes, 1983. Man. Dept. Nat. Res. Fish. Br. MS Report No. 84-25, 70pp.
1986	Derksen, A.J. 1986. Ecological Monitoring - Fisheries 1985 Progress Report. Man. Dept. Nat. Res. Fish. Br. April 9, 1986. 43.pp.
	Kirton, J.A.W. 1986. Fish population data from Rat, Karsakuwigamak, and West and Central Mynarski lakes, 1984. Man. Dept. Nat. Res. Fish. Br. MS Report No. 86-03, 48pp.
	_____1986. Fish population data from Split and Stephens lakes, 1984. Man. Dept. Nat. Res. Fish. Br. MS Report No. 86-04, 61pp.
	Green, D.J. 1986. Summary of Fish mercury data collected from lakes on the Rat-Burntwood and Nelson River systems, 1983-1985. Man. Dept. Nat. Res. MS Report No. 86-06, 359 pp.
	Mohr, L.C. and J.A.W. Kirton. 1986. Fish population data from Sipiwesk and Cross lakes, 1985. Man. Dept. Nat. Res. Fish. Br. MS Report No. 86-28, 83pp.
1987	Sopuck, R. D. 1987. A study of lake sturgeon (Acipenser fulvescens) in the Sipiwesk Lake area of the Nelson River, Manitoba, 1976-1978. Man. Dept. Nat. Res., Fish. Br. MS Report No. 87-2, 59pp.
	Hagenson, I. 1987. Fish population data from Rat and Split lakes, 1985. Man. Dept. Nat. Res. Fish. Br. MS Report No. 87-04, 59pp.
	Kirton, J.A.W. 1987. Fish population data from Macheewin, Osik, Footprint and Threepoint lakes, 1984. Man. Dept. Nat. Res. Fish. Br. MS Report No. 87-06, 78pp.

Appendix B1, continued.

Year	Title
1987	Green, D.J. 1987. Summary of fish population data from Rat and Threepoint lakes, 1986. Man. Dept. Nat. Res. Fish. Br. MS. Report No. 87-07, 47pp.
	Kirton, J.A.W. and L.C. Mohr. 1987. Fish population data from Wuskwatim and Apussigamasi lakes, 1984. Man. Dept. Nat. Res. Fish. Br. MS Report No. 87-08, 44pp.
	Sopuck, R.D. 1987. An analysis of changes in the Pipestone Lake fish community from 1980 to 1986. Man. Dept. Nat. Res., Fish. Br. MS Report No. 87-11, 59pp & Appendices.
	Livingston, L. 1987. A checklist of phytoplankton genera for Nelson River and Rat-Burntwood lakes, 1980, 1981 and 1986. Man. Dept. Nat. Res. Fish. Br. MS Report No. 87-14, 20pp.
	Hagenson, I. 1987. Fish population data from Split and Stephens lakes, 1986. Man. Dept. Nat. Res. Fish. Br. MS Report No. 87-26, 59pp.
	Green, D.J. 1987. Summary of fish population data collected from eight lakes on the Rat-Burntwood River System, 1985. Man. Dept. Nat. Res. Fish. Br. MS Report No. 87-27, 130pp.
	Mohr, L. 1987. Fish population data from Sipiwesk and Cross lakes, 1986. Man. Dept. Nat. Res. Fish. Br. MS Report No. 87-28, 87pp.
	Anonymous. 1987. A manual for ecological monitoring - data collection procedures. Man. Dept. Nat. Res. Fish. Br. June, 1987.
	Mohr, L. and Livingston, L. 1987. Ecological monitoring zooplankton analysis methodology for 1986/87. Man. Dept. Nat. Res. Fish. Br. June, 1987.
	Derksen, A.J. and D.J. Green. Total mercury concentrations in large fishes from lakes on the Churchill River Diversion and Nelson River. Canada-Manitoba Agreement on the Study and Monitoring of Mercury in Churchill River Diversion. Tech. Appendices to Summary Report Volume 4, paper no. 17.

Appendix B1, continued.

Year	Title
1988	Derksen, A.J. et.al. 1988. Ecological Monitoring - Fisheries 1986 Progress Report. Man. Dept. Nat. Res., Fish. Br. March, 1988.
	Livingston, L. 1988. Summary of phytoplankton data for the Nelson River and Rat-Burntwood lakes, 1987. Man. Dept. Nat. Res. Fish. Br. MS Report No. 88-04, 164pp.
	Green, D.J. 1988. Summary of fish population data from Rat and Threepoint lakes, 1987. Man. Dept. Nat. Res. Fish. Br. MS. Report No. 88-11, 55pp.
	_____. 1988. Summary of fish population data from Sipiwesk and Cross lakes, 1987. Man. Dept. Nat. Res. Fish. Br. MS Report No. 88-12, 90pp.
	Patalas, J.W. 1988. The effects of commercial fishing on lake sturgeon (Acipenser fulvescens) populations in the Sipiwesk Lake area of the Nelson River, Manitoba, 1987-1988. Man. Dept. Nat. Res. Fish. Br. MS Report No. 88-14, 38pp.
	Hagenson, I. 1988. Fish population data from Split and Stephens lakes, 1987. Man. Dept. Nat. Res. Fish. Br. MS Report No. 88-15, 66pp.
1989	Green, D.J. 1989. Summary of fish population data from Sipiwesk and Cross lakes, 1988. Man. Dept. Nat. Res. Fish. Br. MS. Report No. 89-11, 91pp.
	Livingston, L.R. 1989. Summary of phytoplankton data for the Nelson River and Rat-Burntwood lakes, 1988. Man. Dept. Nat. Res. Fish. Br. MS Report No. 89-07, 81pp.
	Green, D. J. 1989. Summary of fish population data from Sipiwesk and Cross lakes, 1988. Man. Dept. Nat. Res. Fish. Br. MS Report No. 89-11, 91pp.
	Green, D.J. 1989. Summary of fish population data from Rat and Threepoint lakes, 1988. Man. Dept. Nat. Res. Fish. Br. MS Report No. 89-13, 69pp.

Appendix B1, continued.

Year	Title
1989	Cherepak, B. C. 1989. The post-flood morphometry and bathymetry of Rat and Threepoint lakes, 1988. Man. Dept. Nat. Res. Fish. Br. MS Report No. 89-14.
	Ramsey, D. J. et al. 1989. Evolution of limnological conditions in lakes of the Nelson and Rat-Burntwood river systems after Churchill River diversion and Lake Winnipeg regulation: I. An Overview. Man. Dept. Nat. Res. Fish. Br. MS Report No. 89-15.
	Hagenson, I. 1989. Fish population data from Split and Stephens lakes, 1988. Man. Dept. Nat. Res. Fish. Br. MS Report No. 89-16.
1990	Green, D. J. 1990. Summary of fish population data from Rat and Threepoint lakes, 1989. Man. Dept. Nat. Res. Fish. Br. MS. Report No. 90-05.
	Green, D. J. 1990. Summary of fish population data from Sipiwesk and Cross lakes, 1989. Man. Dept. Nat. Res., Fish. Br. MS. Report No. 90-06.
	Hagenson, I. 1990. Fish popualtion data from Split and Stephens lakes, 1989. Man. Dept. Nat. Res., Fish. Br. MS. Report No. 90-07.
	Cherepak, B.C. 1990. The post-flood morphometry and bathymetry of Split and Stephens lakes, 1989. Man. Dept. Nat. Res., Fish. Br. MS Report No. 90-08.